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## Bureau of Educational Research

COLLEGE OF EDUCATION

First Annual Report

Announcement, 1919-20



Price, 25 cents

PUBLISHED BY THE UNIVERSITY OF ILLINOIS  
URBANA



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BUREAU OF EDUCATIONAL RESEARCH—BULLETIN No. 2

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## FOREWORD

This bulletin is at once a yearbook embodying the work of the Bureau of Educational Research last year and an announcement indicating the projects which the Bureau contemplates and the test business which it is prepared to do. Acknowledgements are made to Mr. H. T. McKinney in connection with the promotion project, to Rev. John A. O'Brien in connection with the reading project, to Miss Velda Bamesberger in connection with the project on memory work in the grades, and to Dr. C. E. Holley in connection with the try-out of group tests of intelligence. These projects are briefly described in Chapter II. In general our indebtedness is very great to the school people of the state for the cooperation they have accorded to the Bureau in the first year of its work.

November, 1919

B. R. BUCKINGHAM

Director



## CHAPTER I. ORGANIZATION.

**Personnel and equipment.** The Bureau of Educational Research of the University of Illinois was created with the appointment of a director in July 1918. No provision had been made at that time in the way of rooms, equipment, or assistance. The director occupied space in a room with three others, and his desk was borrowed. So also was the stenographer who attended to his mail.

Nor were rooms, materials, or personal service easily obtainable. The war was on, and all available space in university buildings was being utilized by the aviators and afterwards by the Students Army Training Corps. As to equipment and service, while ample funds had been provided for them, they were almost impossible to obtain. Experienced stenographers and clerks were not to be had, and it was a long time before even those without experience could be secured and their training begun. Deliveries of equipment were very uncertain, were generally long delayed, and sometimes failed altogether. Thus to the usual difficulties of organizing such a venture as the Bureau represents were added far greater difficulties due to the time when the organization took place.

Nevertheless, now after a little more than a year the Bureau is occupying five rooms in which eleven full-time and three half-time employees are working. The Bureau personnel includes a director and assistant director, two faculty members of the rank of assistant, two library assistants, three stenographers, and two clerks. The three half-time employees are students. One of them is a stenographer and the other two are shipping clerks.

A great deal of time and energy was used during the first year of the existence of the Bureau in building up this organization and in the purchase and installation of the \$4000 worth of equipment now in use. Yet a great deal more was done than simply to organize. Perhaps the surest indication of this is the amount of mail matter received by and sent from the Bureau. Besides great quantities of other than first class matter, there were during the year ended June 30, 1919, 2918 incoming letters and 3674 outgoing letters. This was for a period of about ten months.

**Reference Library.** The collection and proper handling of the sort of printed material which the Bureau needed to have at its disposal, constituted a large part of the work during this, the first year of organization. At present we have about 400 courses of study, 300 city and state educational reports, the school laws of all the states which publish such compilations, 138 volumes of surveys, and about 3000 bulletins and pamphlets of various kinds. Fifty-nine periodicals are regularly received by the Bureau.

**Educational Tests and Measurements.** Many activities of the Bureau have been in connection with standardized test material. In this field five lines of work may be noted: (1) publication and purchase of test materials; (2) the preparation of accessory material for the administration and scoring of the tests; (3) distribution of these materials to the schools; (4) the derivation of new tests; and (5) correspondence relative to the use of test materials by teachers and superintendents.

**(1) Publication and Purchase of Tests.** The Bureau publishes far the greater part of the test material which it distributes. No other similar bureau does this to so great a degree. The Bureau is the sole publisher of the following tests including in each case directions, score sheets, and other necessary accessories:

1. Buckingham's Extension of the Ayres Spelling Scale.
2. Buckingham's Scale for Problems in Arithmetic, Divisions 1, 2, and 3.
3. Charters' Diagnostic Language Tests, Pronouns, Verbs A, Verbs B, and Miscellaneous.
4. Charters' Diagnostic Language and Grammar Tests, Pronouns, Verbs A, and Miscellaneous.
5. Cleveland Survey Arithmetic Tests.
6. Harlan's Test for Information in American History.
7. Holley's Picture Completion Test for Primary Grades.
8. Holley's Sentence Vocabulary Test.
9. Monroe's Diagnostic Tests in Arithmetic, Parts I, II, III, and IV.
10. Monroe's Standardized Reasoning Tests in Arithmetic, Tests I, II, and III, forms 1 and 2.
11. Monroe's Standardized Silent Reading Tests, I, II, and III.
12. Monroe's Timed Sentence Spelling Tests I, II, and III.
13. Willing's Scale for Measuring Written Composition.

Permission has also been given to the Bureau to print and distribute the following, together with accessories:

14. Gray's (C. T.) Standard Score Card for Measuring Handwriting, Forms I, II, III, and IV.
15. Gray's (W. S.) Oral Reading Test.
16. Gray's (W. S.) Silent Reading Tests.
17. Starch's Punctuation Scale.
18. Thorndike's Scale Alpha 2: Understanding of Sentences.
19. Thorndike's Visual Vocabulary Scales.

The Bureau likewise publishes score sheets, directions, standards, and answer sheets for a number of other tests and scales which it purchases from other publishers. Among those for which some or all of these accessories are published by the Bureau are the following:

1. Ayres' Handwriting Scale.
2. Ayres' Spelling Scale.
3. Freeman's Chart for Diagnosing Faults in Handwriting.
4. Hahn-Lackey Geography Scale.
5. Henmon's Latin Tests.
6. Hotz' First Year Algebra Scale.
7. Minnick's Geometry Tests.
8. Nassau County Supplement to the Hillegas Composition Scale.
9. Sackett's Scale in Ancient History.
10. Sackett's Scale in United States History.
11. Starch's Physics Tests.
12. Thorndike's Handwriting Scale.
13. Trabue's Language Scales.
14. Woody's Arithmetic Scales.

Besides the tests listed above, the Bureau also purchases from other publishers certain tests which are completely equipped with the accessory material needed in using them. The most conspicuous ones are the various Courtis tests—Arithmetic, Series B, Supervisory Test in Geography, and the Silent Reading Test, No. 2.

**(2) Preparation of accessory materials.** As may be inferred from the above statement, the authors of a considerable number of standardized tests have not provided directions for administering and scoring them or score sheets on which results may be systematically recorded. The Bureau has been engaged during the past year in making good these deficiencies, until it is now able to announce that every test which it offers for sale will be furnished with all the necessary instructions and forms for using it.

**(3) Distribution of tests.** Test material has been sold in every section of the United States. Naturally, orders came from Illinois in greater numbers than from any other state. The total sales up to the 30th of June, 1919 amounted to about 77,000 copies of tests of an approximate value of \$900.00. Now, however, it appears that this was only a beginning. At the present writing (October 15th, 1919) the Bureau has already received orders for three or four times as many tests as were sold during the whole of last year.

Since the great volume of orders clearly indicates that a distinct service can be rendered to superintendents and teachers by making easily accessible standardized tests accompanied by

the necessary accessories, the Bureau is undertaking to render such service. Since the project is assuming considerable dimensions it is necessary to put it on a business basis. The retail prices of test materials includes a sufficient advance over the printing or purchase cost to defray the expense for stenographic and clerical service required for handling the materials. The resources of the Bureau are such that it is able to print or purchase tests in large quantity thus securing minimum prices and maintaining a stock of sufficient size so that even orders for large numbers of tests can be filled at once.

**(4) Derivation of tests.** No small attention has been given to evaluating new test material. Some of this material has been printed; while some of it still requires much more cooperative effort before it can merit publication. Returns were received from over two hundred superintendents and principals involving more than 50,000 pupils. A more detailed account of these projects will be given in the next chapter.

**(5) Correspondence concerning tests.** A considerable correspondence has always been carried on concerning the tests. Sometimes orders are ambiguous and we have to write for fuller information. Sometimes orders cannot be filled completely and letters explaining the situation have to be written. Advice is frequently asked as to what test to use, as to the meaning of certain test-questions, what answers to regard as correct, what score should be given under certain circumstances, what the meaning of the results is, and what can be done to remedy defects. Someone in the Bureau always sends a reply in which an attempt is made to furnish the desired information. Some of the inquiries have been very suggestive and have resulted in the preparation of useful directions and explanations to accompany the tests.

**Organization of Bureau into divisions.** Thus as the organization of the Bureau progressed during the year 1918-19, it did so with particular reference to two purposes. The first was to obtain and properly handle as rich a collection of research material as possible. The second was to distribute the best test material and to assist school people in its use and interpretation. It is natural, therefore, that as the second year of the life of the Bureau begins, these two major lines of work should be the bases for the first organizations of the Bureau into divisions. We now have the Division of Educational Tests and Measurements at the head of which is Dr. Walter S. Monroe, the assistant director of the Bureau, and the Library Division which consists of two library assistants who catalog and index the printed material received by the Bureau. They also prepare bibliographies and assemble evidence on problems submitted to the Bureau by the school people of the state and by university students and faculty members.

It is probable that this divisional organization of the Bureau will be carried out more completely as the Bureau develops and meets more fully the educational needs of the state. What these educational needs are has been in part revealed by the school people themselves. In November 1918 and again in April 1919 a circular letter and questionnaire were sent to all superintendents and high school principals of the state and to principals of elementary schools in a few of the larger cities. Four hundred forty-eight replies were received. These have afforded and will continue to afford a sure basis of action. Almost all the writers said that they were interested in the experimental study of education, that they wished to unite with the school men and women of the state in such study, and that the Bureau could help them in ways which they specifically indicated. They also listed the topics which they would like to study. Since far the greater part of these topics concerned some phase of educational tests, it was natural that first consideration should be given to this expression of interest. Hence the organization of the Division of Educational Tests and Measurements under Dr. Monroe. The Library Division constituted a service line equally available for all types of work. What the Bureau has done and hopes to do through this division will be set forth in another place.

**Intelligence testing.** The responses of the school men and women of the state clearly indicated the need for other types of work than those relating to educational tests and measurements. As these other types of work develop, it is to be expected that other divisions of the Bureau will be created. For example, the demand for intelligence tests in the schools is becoming more and more insistent. With the devising of simple intelligence tests which may be given simultaneously to large numbers of children—tests which at the same time seem to be more reliable than any group tests we have hitherto used—their availability for school use becomes apparent. As long as we were obliged to test children individually and the work required a high degree of expertness, the idea of basing action with reference to school children upon their mentality, although it was recognized as important, could not be carried out in practice. Now, however, it is not too much to expect that wide-awake principals and superintendents will require that all children in their schools be mentally tested upon entrance to school and periodically thereafter. At present this demand is affecting the Bureau only in a small way. We are offering this year four group intelligence scales for sale. So far as we know, this is the first time a bureau has announced that it will distribute such tests. These intelligence tests are described in another part of this bulletin. A description is also given of other group intelligence tests which may be purchased elsewhere.

It is probable, however, that the time will shortly come when it will be necessary to set up a division of intelligence tests either within the Bureau or in the Department of Educational Psychology or by some co-operative arrangement between that Department and the Bureau.

**School accounting.** Similarly the demand for a better system of school accounting is likely to develop this type of work beyond the ability of the Bureau to handle it without a definite organization for that purpose. Accordingly, an accounting division may not inappropriately be created.

**School housing.** Again, requests for advice as to school-house construction, ventilation, and sanitation, became particularly insistent during the spring and summer of last year. This demand does not so often come from professional educators as from Boards of Education and building committees. Several hundred school houses are built each year in the state of Illinois. For the most part, the construction is under the direction of architects who have no special knowledge of the problems of school housing. Unless some other agency of the state takes care of the need arising from this situation, the Bureau can render a very real service to the cause of education if it secures the services, at least a part of the time, of an architectural engineer. Thus may be created another division of the Bureau.

Whether any or all of these divisions—or other divisions not mentioned—will be organized will depend wholly upon the amount and character of the needs of the schools. These needs will be expressed in the form of requests for service. The Bureau will not be justified in developing a specific functional division unless the demand is strong for the service which such a type of organization alone can perform.

## CHAPTER II. PROJECTS UNDERTAKEN

Organization work last year did not prevent the undertaking of several research projects. While most of these will be made on the basis of subsequent reports they will be briefly described in this chapter.

### PROMOTION STUDIES.

**Promotion as an administrative problem.** There is evidence to show that the present method of promoting children is unsatisfactory. In particular it is evident that it disregards to an astonishing degree differences in ability among children. With the movement to measure the product of instruction we have come into possession of a vast body of data on this question of individual differences. Years ago we knew that these differences existed, but we did not know how great they were. We have now become familiar with the notion that in a given subject twenty or thirty percent of the children in a grade will show ability equal to or greater than that of typical children in the next higher grade, or that ten percent of them will surpass typical children graded two years above them. Yet it is difficult to find a school system which uses such information to secure a better classification of children.

There is also evidence that children do not profit by repeating the work of a grade. Professor H. L. Smith of Indiana University in his "Survey of a City School System" gives figures to show that children spending a second year in a grade do not obtain higher marks than they did during the first year. Our own investigations show that although teachers confidently expect children to do better work when repeating a grade,—and indeed keep them back in order that they may,—the majority of them fail to do so. While, therefore, it is true that in addition to children of higher-grade ability there are also children of lower-grade ability in every class, this is not in itself a sufficient reason for holding them back or for demoting them. It may be a reason for placing them in some kind of a special class better suited to their needs than the regular class. But it seems likely that the intellectual loss due to a repetition and the moral loss due to a sense of failure are the only inevitable results of a policy of holding children back or of demoting them.

**Trial promotion.** There are certain means at hand, even in schools quite unaffected by the results of experimental methods, for preventing this intellectual and moral loss. No school, for example, needs to base its decision as to the promotion of a child merely upon his record in the grade prior to that to which promotion is contemplated. A child upon completing the work of the sixth grade becomes a candidate for advancement to the seventh grade. If he secures the promotion, he will

often have a new teacher and a different room. He will certainly be brought in contact with a richer curriculum. It may be a question of entrance into a Junior High School. How then shall we decide whether this sixth grade child shall be promoted to the seventh grade? Shall we do so on the basis of his sixth grade work or on the basis of a trial in the seventh grade? Suppose the child in question has not done the sixth grade work very well—perhaps has not “passed” the final examination in the sixth grade. Are we to require him to do the sixth grade work over again with the chances about even than he will do it no better than he did it before? Or shall we give him a trial in the new grade with its new teacher and more interesting course of study? Shall we consult the needs of the child or the grade standards of our schools? Shall we decide the question of a child’s advancement on the basis of what he has learned or on the basis of what he needs to learn?

**Two promotion projects undertaken.** In deciding to make a study of promotion as an administrative question two points of view are adopted. The *first* has to do with individual differences and the *second* with the advancement of all pupils to the next higher grade and the special treatment of doubtful pupils during a probationary period. The first of these points of view was adopted in an investigation carried out at Danville, while the second was exemplified in a study made at Decatur and Springfield. The details of these investigations were largely in the hands of Mr. H. T. McKinney, a graduate student in education.

**(1) Individual difference method.** Superintendent G. P. Randle of Danville consented to have given toward the close of the first semester of 1918-19 a series of tests to the children in grades three to eight of all the elementary schools in the city. This series consisted of three types.

The first was designed to give data concerning the child’s proficiency in the curriculum as taught at Danville. Each child in the lower fifth grade for example, was given the arithmetic test pertaining to his grade. If he passed, he was allowed to take one pertaining to the upper fifth grade, and so on as far as his success permitted him to go. Thus, in terms of the curriculum, a child would show title to promotion in arithmetic to the grade next higher than the last one whose test he passed successfully.

The second type of testing was made with standardized material in the major subjects. According to their performing on these tests, children were rated as possessing the ability of the grade whose standard they most nearly approached.

The third type of testing consisted of half of the Pressey Group Point Scale. This was designed to measure the intelligence of the pupils.

**Promotion results.** With data from these sources in hand, with the teachers' estimates of the abilities of the pupils, and with the knowledge of their chronological ages, it was felt that an intelligent selection of pupils for additional promotion could be made. Unfortunately, owing to a number of delays and to insufficient clerical help, the final results were not available till long after the mid-year promotion. Accordingly it did not seem advisable to advance a very large number of pupils an additional grade. All of those who were candidates for such additional advancement had already been promoted one grade by the regular process.

Nevertheless, the testing at Danville was not without results in the form of additional promotions. For example, nine children were promoted from the upper third grade to the lower fourth grade in March after having secured their regular promotion at the beginning of February. In June all of these nine were again promoted thus offering conclusive evidence that they were sustaining themselves after their extra promotion. Miss Nelle Haley, the primary supervisor at Danville, reports that these nine children "now stand in the upper fourth of the 4A class." Only two children were promoted from the lower fourth grade to the upper fourth grade but both of them made good again in June and are now among the best in their class.

The largest number of promotions was made from the upper fourth grade to the lower fifth grade, exclusive of those in the Lincoln School. There were thirty of these, twenty-eight of whom stood high on the promotion lists in June. At the Lincoln School, due to the crowded conditions, the ten children selected for promotion from the upper fourth grade to the lower fifth grade could not be advanced in March. They were told, however, that a double promotion would be given them in June if their work kept up to the March standard. In every case the double promotion was made and these ten children are leading 5A class at the present time.

We wish to repeat the investigation of the possibilities of additional promotion based on individual differences. Whether this is done again at Danville or elsewhere we shall be able greatly to improve our method. More group intelligence tests are now available than were available last year. The curriculum testing should be abandoned. It serves no useful purpose except to exhibit the fact that some children, in spite of the new subject matter introduced in higher grades, are able to pass a satisfactory examination on it. The writer believes that a good group intelligence test will alone afford a reasonable basis for the placing of capable pupils in grades higher than those in which they are now classified. Not many mistakes will be made, and those which are made will not be serious in their consequences.

**(2) Probationary promotion method.** The promotion project as it was carried out with the co-operation of Superintendent Allen at Springfield and Superintendent Engleman at Decatur contemplated, as has been said before, a probationary period during which children who would not normally secure promotion were given an opportunity to sustain themselves in the next higher grade. This plan was first put into effect at the close of the first semester of 1918-19. Teachers were requested to make out the usual lists of promoted and non-promoted pupils. After these lists were in the hands of the superintendent then, and not until then, teachers were informed that all children were to be placed in the next higher grade. The probationary period for pupils not originally recommended for promotion lasted six weeks, during which time every effort was made on the part of the teachers to cause the probationary pupils to make good their promotions.

Right here we see a marked change of emphasis and a new result. In recent years, during which a very general effort has been made to reduce retardation and elimination, teachers who secure a high promotion rate are commended. Little account, however, is taken of what becomes of children after they have been promoted. The receiving teacher gets rid of them by one means or another; and it is not unusual for her to complain of the preparation which the children have for the work of her grade. According to the scheme as administered at Decatur and Springfield, it is the receiving teacher rather than the sending teacher who must make the effort to secure a high percentage of promoted pupils. Moreover, it is to be observed that the effort is made by the teacher with the subject matter and in the grade having to do with the present work of the child.

**Results of project.** Accordingly, it was not surprising that the teachers in these two cities put forth unusual effort to cause the children to maintain themselves in the grade to which they had been provisionally advanced. An individual record card was provided for each probationary pupil and on this card a record was kept by the teacher. The most interesting part of this record consisted of a notation of the devices and methods used by the teacher to secure extra effort on the part of the pupil or of his parents. One device which was quite generally used consisted of a daily report from the teacher to the parents. This report was signed by the parent and returned the next morning.

As a result of this method about seventy-five percent of the children at Decatur and Springfield, who were not recommended for promotion by the sending teacher, and who according to the usual plan would not have been promoted, were retained in the higher grade by the receiving teacher. The total promotion rate was over ninety-five percent. Mental tests were subsequently given to the five percent who failed of promotion and as might

have been expected many of them were found to be of inferior mental ability. A careful analysis of these faults is being made with a view to recommending special treatment for these cases.

When the question was raised whether the same plan should be followed in June as had been followed in February, Superintendent Allen of Springfield sent a questionnaire to his teachers—a questionnaire which they were asked to make out without signing. The teachers unqualifiedly recommended certain features of the plan, made valuable criticisms of some of the other features, and in a few cases raised objections involving especially observations on the extra work required. Of the 146, however, who answered the question "Do you favor continuing the new plan?" 136 said "Yes" and 10 said "No." Some very interesting special cases of the benefit which individual children had derived from the plan were given. A similar attitude toward the plan was taken by the teachers of Decatur. Accordingly, in June it was again put into operation in both cities. At this writing the corresponding probationary period has just ended. The results, therefore, of the June promotions are not yet available. It is interesting, however, to note that at Springfield of 775 pupils listed for failure in February but subsequently promoted after the probationary period, 370, or nearly one-half, were unconditionally recommended for promotion in June and thus secured their advancement without the probationary period which they passed through in February. In other words, these 370 pupils had not only been promoted in February after being regarded as failures but had also been promoted in June—and this time without question. As to the Decatur children, Superintendent Engleman reports that *more than half* of the February probationary pupils who were advanced to a higher grade were recommended unconditionally for promotion in June.

It is evident that the value of such a method of promoting pupils cannot be determined from a single application of it. Each added semester during which the superintendents and teachers at Decatur and Springfield operate the plan will add to the value of the conclusions which can be based upon it. Perhaps all we are justified in saying at this point is that the method has been successful so far and that it offers interesting and important possibilities.

#### RATE OF SILENT READING

**The social demand for rapid silent reading.** It is easy to maintain that reading is the most important subject which a child learns while at school. It functions in all his study and it is the one product of instruction which he will surely use in adult life. The amount of reading which both the child and the adult are required to do is very great and is increasing. Of the making of many books there is no end, and the time required to read

them bulks surprisingly large in the life of a civilized human being. The literary or professional man must labor unceasingly to keep abreast of the work in his field. Even a child has his "assigned readings," and in addition to these he may investigate a large assortment selected by himself.

Probably, therefore, no service which the school could perform would be more gratefully received or more instantly approved than the training of children to read rapidly without sacrificing comprehension. It is a matter of common observation that people differ widely in the rate with which they can read, and it is almost as generally recognized that those who read rapidly do not do so at a sacrifice of their understanding of what they read. There are indications also that almost anyone may be taught to read more rapidly than he is now reading.

This aspect of the problem of reading is not receiving much attention. As understood in the schools, to read well generally means to do so orally without mispronunciation and with a well modulated voice—perhaps even with the elecutionary effect. In life outside of the school room and after school days are over there is little use for this kind of reading. As we say, it has little social value. With silent reading the case is quite different. Both children and adults use constantly whatever skill they have acquired in this art. If it is true that a person's mastery of thought and theory in his chosen field depends, as indeed it does to a large extent, upon the degree to which he has covered the literature of his field, then the problem of devising a type of training in reading which will make this mastery possible at a minimum expenditure of time is urgent.

It seemed appropriate, therefore, that the Bureau should investigate the extent to which the schools can impart more efficient habits of reading, and more particularly how pupils can be taught to read more rapidly.

**How the eyes move in reading.** In this connection an analysis of the act of reading is important. From photographic records of eye movements we know that in sweeping from left to right along the printed line the eye pauses several times. We know too, that the movements of the eye between pauses are so rapid that reading does not take place during the movement—in other words, that we read only while the eye is at rest. Our records together with those of other investigators seem to indicate that almost the entire time of reading—certainly as much as 95 per cent of it—is consumed during the pauses which the eye makes.

Evidently, then, the fixation pauses which really are the core of the reading process must be influenced in some way if the rate of silent reading is to be accelerated. Any practicable decrease in the total of reading time must be accompanied either by a lessening of the number of pauses or by a shortening of each pause or by both these processes. Here we are clearly in the realm of

habit-formation. Early in their school career children form certain eye habits which they use and continue to use in reading. There is evidence to show that children do not materially increase their rate of careful reading after they have completed the sixth grade. What we know of the formation of habits leads us to believe that there are lower order habits and higher order habits. The rapid readers whom we know have been able to replace the former by the latter. They see more at each fixation or pause in the line. Perhaps in extreme cases they see an entire line at a single pause. The amount of printed material which the fastest readers grasp at each pause is apparently well within the field of clear vision. No physiological limit seems to exist to prevent improvement in the rate of reading even on the part of the most rapid readers.

**How the experiment was conducted.** Superintendents and principals in nine different cities in Illinois participated in an investigation which was intended to throw light on the possibility of teaching children to read rapidly. Records were obtained from about 1600 pupils ranging from the third to the eighth grade. Each child was tested for rate of silent reading with Form I of the Courtis Silent Reading Test, No. 2. His comprehension record was also taken. On the basis of the rate records each class was divided into two groups of children whose scores were approximately the same. One of these groups was the experimental group and the other the control group. To the experimental group reading was taught according to a method which was designed to increase the rate. To the control group reading was taught in the usual manner.

The details of the special method by which the experimental group was taught will be fully reported in a future bulletin by Reverend John A. O'Brien, who was immediately in charge of the investigation. The method was outlined in general before the work began and at a meeting of representatives from all the schools concerned the details were worked out. Each teacher kept careful daily records and a dairy. Each pupil in the experimental group kept a daily graphic record of his rate of reading.

The experimental period lasted 39 days and the teaching time was 30 minutes each day. On the 19th day of the period Form 2 of the Courtis Silent Reading Test, No. 2 was given to both the experimental and control groups. Form 3 of the same test was given to both groups on the 39th day.

Thus, besides the individual charts showing rate of silent reading in daily recitations, records for each child were also obtained in the Courtis Reading Test at the beginning, middle and end of the experimental period.

**How it worked.** It not infrequently happens that an experiment, after extending over a long time and involving considerable expense, yields negative results. If two methods are being compared it frequently happens that neither of them appears to be

better than the other. This was emphatically not the case in this study. The children in the experimental group improved their reading rate and surpassed the children in the control group to an astonishing degree. Indeed, the improvement in rate of silent reading looked "too good to be true." In the case of one teacher who made an admirable report but whose figures showed an almost unbelievable amount of improvement for the pupils in her experimental group, some pains were taken to check up the figures. No reason, however, appeared to exist for doubting them except the fact that they were altogether at variance with our usual experience.

We, therefore, feel justified in saying that by means of a special method similar to the one used in this investigation, the rate of silent reading for the child of average ability may be greatly increased without sacrificing comprehension. How great this increase may be is yet a question, but there are certainly well established instances in which during the 39 days of practice the rate of silent reading was more than doubled. It is probable that all of this increase in rate will not be maintained. The practice period was altogether too short to ensure a lasting acquisition of the higher order habits to which we have referred, but in school practice the method could be carried out for any desired length of time and the higher order habits could be made a permanent possession. The very least that can be concluded from this investigation is that the ordinary method of teaching reading is vastly less effective in imparting rate of silent reading than a method specifically designed for that purpose. Whether in 39 days a pupil may double his rate while losing nothing in comprehension is not the vital question. The real questions are *first*, is it desirable that rapid silent reading be taught in the schools; *second*, if so, can a method be devised which will be clearly superior to the usual method of teaching reading. Our investigation enables us to answer both these questions in the affirmative.

#### DERIVATION OF TESTS

As a result of the questionnaire which was sent out last year to school superintendents and principals, it was possible to group together those who expressed interest in similar problems. Many indicated their fields of interest by naming a school subject, as reading or arithmetic. In fact it was not difficult to form a group for each of the principal elementary school subjects.

Of course these different groups of school people might be appealed to in any one of a number of ways. Instructional, supervisory, and administrative problems might be, and in some cases were, studied with reference to these subjects of interest. But the development of a larger and richer body of test material for certain of the subjects was thought to be particularly im-

portant. It was felt, in other words, that one function of the Bureau ought clearly to be the creation of additional standardized material.

Accordingly, a few superintendents and principals who had expressed interest in arithmetic, geography, and history were approached last fall and requested to submit to their pupils certain series of questions in these subjects. The number of schools involved at that time was not large owing to the effect of war work and of the influenza epidemic. Last April, however, when the same or similar material was again ready for distribution, a very much greater number of superintendents and principals gladly undertook the work. In this instance grammar was added to the subjects above mentioned.

**Arithmetic.** The material in this subject consisted of verbal problems. Some were sent out to the schools in November, many more in April. The following are some of the significant figures:

Number of superintendents and principals approached	293
Number to whom material was sent	188
Number who returned material	133
Number of problems submitted	232
Number of children from whom returns were received	31,480

This material was rated by teachers according to the directions and answer cards submitted; and all of it has now been assembled and tabulated. Those from whom material was received were furnished with a report indicating not only the scores of their children but also the scores of all the other children who answered the same questions.

At intervals during the period of three or four years prior to this testing the writer had been offering most of these problems to such superintendents and principals as were willing to co-operate with him. The new data afforded by the testing in November and April of last year seemed sufficient to warrant the formation of a scale. This scale has now been published by the Bureau of Educational Research under the title of "A Scale for Problems in Arithmetic." It consists of three divisions. The first is offered for grades three and four, the second for grades five and six, and the third for grades seven and eight. The easiest problem in the scale is: "We learn two words a day in our class. How many do we learn in 8 days?" The hardest problem is: "Mr. Wood had 250 baseballs. He sold 20% of them the first day and 40% of the remainder the second day. What per cent of his original stock was left?" The value of the easiest problem is 2.7 and that of the hardest 9.4. The easiest problem is correctly solved by more than half of the third grade children while the hardest problem is solved by but little more than half of the eighth grade children. A problem is located at each step of the scale and the

steps are 0.2 or 0.3 units apart. Thus we have a difficulty scale ranging by small intervals from a typical third grade problem to a typical eighth grade problem.

This year the scale will be enriched by introducing several problems at each level of difficulty. Probably a second or alternative form for the test now presented will also be formulated.

**Geography, history, and grammar.** A large amount of material in each of these subjects was submitted for evaluation. In geography there were twelve tests each containing twelve questions; in history there were three tests each containing twelve questions; and in English grammar there were ten tests each containing twelve questions. The following figures indicate the scope of the work as it was done last year. In each subject, however, the writer had previously submitted the same questions to large numbers of children.

	Geography	History	Grammar
Number of superintendents and principals approached	40	40	40
Number to whom material was sent	32	17	31
Number who returned material	25	14	29
Number of questions submitted	144	36	120
Number of children participating	9,575	4,066	11,000 (approx.)

The testing in these subjects has not yet eventuated in the construction of scales or standardized tests. Much more material will have to be received before such an outcome can be expected. The subjects do not themselves yield to arrangement in scale form as readily as do some other subjects. It will be the task of the Bureau this year to round out the body of material in hand with reference to these subjects and to issue scales in them if it appears practicable to do so.

**Spelling.** Using material which the writer had previously obtained for the most part in states other than Illinois, an extension of the Ayres Spelling Scale was devised. This was done with the very generous permission of Dr. Ayres. Five hundred five new words were added to the thousand of which the Ayres Scale consists. These words tended to be more difficult than those of the original scale. It was felt that this was fortunate because admirable as the Ayres Scale is, it is less available for use in upper grades than it is in middle and lower grades because of the fewness of the words at the high end. Since most of the new words fall into the columns at the upper end of the scale, the resulting extension, merely as an instrument for measuring spelling ability, is more satisfactory.

It is to be understood, however, that the Extended Ayres Scale no longer constitutes a fundamental vocabulary, scientifically determined. The added words were not obtained, as were the original words, from tabulations of frequency of use. It is felt by the writer that the new words are useful, but he realizes

that this is more or less his personal opinioin. They were selected from a much larger list secured from the agreements among spelling books. It is, therefore, impossible to suppose that these 505 new words are the next most common words after the thousand contained in the Ayres Scale.

In constructing this extension of the Ayres Scale, the original scale was not disturbed. All the new words are printed in the appropriate columns under the old words and in italics. A person, therefore, who secures the "Extension" also has the original Ayres Scale intact.

#### MEMORY WORK IN THE GRADES

**The problem.** Early last year, Superintendent H. Q. Hoskinson, of Pinkneyville, Ill., wrote the Bureau requesting information as to standards for memory work in the elementary school. He wished to know what poems were suitable material for memorizing and also how much memory work ought reasonably to be required in each grade.

Upon investigation it appeared that there was no literature bearing on this subject. This is rather remarkable since it is quite common to require certain passages to be memorized by children and one would suppose that the selection of these passages and the determination of the amount of memory work which ought to be imposed would have engaged the attention of investigators.

**The method.** Convinced therefore of the value of more information bearing on the questions raised by Superintendent Hoskinson, we decided to examine the courses of study of elementary schools with a view to finding out what the practice is in selecting material to be memorized. All the printed courses of study, amounting to about two hundred, which the Bureau had on hand were examined to find out what provision was made for this sort of work. Most of the courses of study were silent on the matter, but fifty of them were found to embody usable material. It is at once evident that most of the literary material prescribed or suggested to be memorized consisted of poetry. For the time being, therefore, the study was made without reference to prose selections.

It was found that three hundred eighty-six poems were mentioned five or more times in the fifty courses of study. A poem was often mentioned more than once in the same course of study. A few poems, for example, were listed for memory work in more than one grade. A poem so mentioned was evidently thought of as sufficiently important to be brought to the attention of the teachers several times. The method, therefore, of counting each mention as often as it occurred rather than of counting the courses of study in which the mentioning of a poem took place seemed to be justified. Nevertheless the method of counting each course of study once was also used as a check on the method

of frequency of mention. The results were not materially different.

The ten most frequently mentioned poems. The poem most frequently mentioned for memorizing, was "America." In fact patriotic poems tended to be mentioned in courses of study throughout successive grades. On the basis, therefore, of frequency of mention these poems stand higher in the list than they would on the basis of the number of courses of study mentioning them.

The following is a list of the ten poems most frequently mentioned.

No.	Author	Title	Times Mentioned	Cities Mentioning	Weighted Value
1	Smith,	America	59	30	207
2	Longfellow,	The Children's Hour	44	39	135
3	Field,	Dutch Lullaby	43	41	136
4	Longfellow,	Village Blacksmith	42	39	134
5	Stevenson,	My Shadow	42	40	130
6	Scott,	"Breathes there a man—"	40	38	139
7	Jackson,	September	41	36	125
8	Key,	Star Spangled Banner,	38	36	135
9	Stevenson,	The Wind	38	32	112
10	Browning,	Songs from "Pippa Passes"	35	30	105

Many interesting facts were disclosed as this study progressed. They formed the basis of a master's dissertation by Miss Velda Bamesberger. The material has all been worked over a second time and a bulletin will shortly be published for general distribution. If there is a demand for it, the Bureau will attempt to publish a collection of the three hundred eighty-six poems which were mentioned five or more times.

Other results of the study. A few interesting and outstanding facts may be listed in concluding this section. (1) Poems were mentioned in the fifty courses of study from one to fifty-nine times. The number of poems mentioned once was one thousand five hundred fifty-five. One poem was listed fifty-nine times (America). (2) The poems were graded according to the agreements between the courses of study, with the result that from forty to sixty poems were assigned to each of the eight elementary grades. (3) Judged by the number of times mentioned, Longfellow is the most popular poet and Stevenson the next most popular. The following are the eight poets each of whom contributed ten or more poems to the list, the numbers in parentheses after each author's name indicating the number of his poems in the list: Longfellow (25), Stevenson (23), Tennyson (17), Sherman (13), Lowell (12), Field (12), Bryant (10), and Wordsworth (10). (4) A record was also taken of the

total number of times the poems by each author were mentioned. For example, Longfellow's twenty-five poems were mentioned a total of four hundred fifteen times; Stevenson's twenty-three poems were mentioned a total of three hundred seventy-six times, etc. On this basis of frequency of mention the first eight most popular poets were the same as those mentioned above although in a slightly different order. Longfellow, Stevenson, and Tennyson were first, second, and third, respectively, both on the basis of the number of poems contributed and on the basis of frequency of their mention. (5) Many of the courses of study did not state the quantity of material to be memorized. Those which did so generally gave the requirements in the form of the number of poems to be committed to memory in each grade. This permits teachers to vary greatly the amount of material by selecting long or short poems. The best general statement is that about six poems are being required to be memorized in every grade from the first to the eighth, with a tendency in grades above the fourth to require seven or eight. The fairly constant requirement of six poems indicates that the amount of material to be memorized increases through the grades. This rests upon the fact that there is a tendency for the poems in the upper grades to be longer than in the lower grades.

Miss Bamesberger in her thesis rightly says: "There are grounds for arguing that no material which enters into the course of study should be more carefully selected than that which is chosen to be memorized by the pupils.

"Out of the vast body of literature in English we sift out a small portion for inclusion in readers and collections of prose and verse. The material rejected enormously exceeds in amount that which is utilized. But the selection of material which pupils will be expected to make their permanent possession must be even more rigidly defined than the material we put into our readers. Thus the body of verse which we are willing to suggest or require to be memorized should represent the very best that our literature affords."

#### INTELLIGENCE TESTING

The school year 1918-19 was characterized by the derivation of several group intelligence tests for school use. The widespread interest in determining the mentality of school children and the insistence of school people upon some device for doing this at an expenditure of time and money within available resources was at the bottom of the development of these types of tests. The feeling of school people about this matter was manifested in the numerous requests received by the Bureau for advice, suggestions, and material with reference to the intelligence testing of children.

**Tests used.** Toward the end of the year and under the direction of acting assistant director Charles E. Holley, several of the more important newly devised group intelligence tests

were submitted to the children of the Champaign Public Schools. The principal object in doing this was to find out how valuable each of these tests was. The following tests were used: (1) Virginia Delta I, devised by Professor M. E. Haggerty for the use of the Virginia Education Commission; (2) Whipple's Group Test for Grammar Grades, being a series of exercises selected from a larger number used in connection with the gifted class operated experimentally at Urbana in 1916-17; (3) Theisen's Classification Test, being a group of exercises based largely on the army mental test used in the examination of recruits; (4) Otis' Group Intelligence Scale—a series of ten tests devised by Lieutenant Arthur S. Otis and published by the World Book Company; (5) The Primer Scale, devised by Luella M. Pressey; (6) The Picture Completion Test, devised by Dr. C. E. Holley; and (7) The Sentence Vocabulary Test, also devised by Dr. Holley. A total of nearly eight thousand of these tests was used. They were not only furnished by the Bureau but were administered, scored, and interpreted by the officers and employees of the Bureau.\* Only a few children were tested with Whipple's Group Test for Grammar Grades and with Holley's Picture Completion Test. Whipple's test required a long time both to give and to score.

**Results.** The following table shows for the remaining five tests the average scores secured in the grades to which the tests were submitted.

TABLE I SHOWING AVERAGE SCORES OF CERTAIN INTELLIGENCE TESTS FOR CHAMPAIGN PUBLIC SCHOOLS.

TEST	GRADE											
	I	II	III	IV	V	VII	VI	VIII	IX	X	XI	XII
Otis Scale	—	—	—	—	—	98	113	128	133	138	145	149
Classification	—	—	—	—	60	84	98	108	118	125	134	141
Primer Scale	43	56	64	—	—	—	—	—	—	—	—	—
Virginia Delta	—	—	48	69	83	103	112	117	—	—	—	—
Sentence Vocabulary	—	—	17	29	34	41	47	52	57	61	64	66

**Evaluation of intelligence tests.** In his report Dr. Holley has examined these tests with respect to the following points:

I. The grade to which the test may be suitably offered. Other things being equal, that test is most valuable which gives significant results for a large number of grades.

II. Ease of administration. This means not only the care with which the directions have been worked out and their simplicity, but also the length of time required for giving the test.

\*The only exception to this occurred in the case of Dr. Holley's Vocabulary test which was administered by the teachers of the respective classes under the close supervision of Dr. Holley.

III. The amount of time required to rate the papers.

IV. The relation between scholarship on the one hand and scores in terms of the scale on the other hand. It is held that fairly high correlation ought to exist between the intelligence and the scholarship of children. Therefore, an intelligence test whose scores do not correlate rather closely with the scholarship ratings made by teachers is presumably an inferior test.

V. Scales which do not reveal sufficiently large differences between the average scores of successive grades manifestly cannot discriminate between the different abilities presented by the children in those grades. Moreover the differences between average scores for successive grades should be reliable differences. Computations of reliability were made as a part of the analysis of the results of these tests.

VI. Finally, the scales may be considered with reference to their component parts. Each one consists of a large number of items, and in most cases these items are grouped so as to bring together those of the same general nature. It is possible that some of the subordinate tests of which the scales are composed may contribute little or nothing to the total score. It may be, for example, that the scores in an analogies test and scores in a similarities test mean much the same thing. It is possible, too, that some of these subordinate tests show inversions as between successive grades. With a view of ascertaining the extent to which these conditions might exist, the analysis of all the scales was made by examining the scores in the subordinate tests. The following table, taken with some modifications, from Dr. Holley's report, indicates the conclusions he reached on these matters.

TABLE II, GENERAL COMPARISONS OF THE SIX INTELLIGENCE TESTS

	1 Scale	2 Range of Suitability (Grades)	3 Time Required for Giving	4 Papers Scored per Hour b	5 Correlation with Scholarship	6 Reliability of Total Scores between Successive Grades	7 Individual Tests
a	Otis	6-12	70	13	0.42	poor	Erratic and poorly balanced
b	Classification	5-12	50	15	0.50	poor	Regular but poorly balanced
c	Virginia	3-8	30	20	0.59	good	Regular but poorly balanced
d	Group	6-8	80	6	*	*	Regular and well-balanced
e	Primer	1-3	25	35	0.34	fair	Regular and well-balanced
f	Vocabulary	3-12	20-40 <sup>a</sup>	40	0.47	good	Regular and well-balanced

<sup>a</sup>No time limit. Requires from 40 minutes in grade III to 20 minutes in grade XI.

<sup>b</sup>According to our office experience.

\*Data not available.

It was the conclusion derived from our experimentation that the present intelligence scales are susceptible of much improvement. Some of them are erratic and poorly balanced. In some cases the reliability of the scores is not as high as it should be or as it can be made. Considerable work may be done to advantage in simplifying the administration and scoring; while nearly all of the tests can probably be improved by making every item and every group of items in them contribute to the significance of the total score.

It is the conclusion of Dr. Holley that the best scales for intermediate and grammar grades are the Virginia Delta I, and the Vocabulary Scale. "A combination of these," he says, "seems to offer the best measuring instrument." The Classification Test seems to be the best for the high school grades. The Primer Scale is well organized from the point of view of administration, scoring, and balance of parts. It does not, however, appear to be of highly discriminating or direct value.

An important beginning has been made in the devising of group intelligence scales. It is not to be wondered at that trials made with these scales reveal discrepancies and difficulties. In spite of these there is every reason to believe that successful group scales will be made. If no greater improvement is recorded in this respect than has been shown in the development of tests of school subjects, we shall shortly have instruments for measuring intelligence that will embody all the essentials of such tests.

#### THESES OF GRADUATE STUDENTS

A considerable part of the research work in education is handled by graduate students under the direction of faculty members. The results of these investigations, although they are written in the form of these or dissertations, are for the most part never published. This is particularly true of dissertations for the Master's degree.

Nevertheless, it is certain that most Doctors' theses and many Masters' theses contain valuable data on significant questions. There should be some way in which these reports can be made available in summarized or bibliographical form so that although we may not have general access to the material, we can at least learn what it is and where it may be found.

It seemed so well worth while to do this, that toward the end of last year the heads of departments of education and of schools and colleges of education throughout the country were asked to submit the authors and titles of the dissertations for the Masters' and Doctors' degrees in Education which had been granted since January first 1917. At this writing almost all colleges and universities have answered this request and an early report of the graduate study in education lately conducted in our higher institutions of learning will be forthcoming.

## TYPE LESSONS

A project was proposed last year to bring out a bulletin or series of bulletins containing stenographic reports of type lessons. For example, several good inductive lessons dealing with different subjects taught to different grades might be obtained and reported just as they were taught. Editorial comment justifying and criticising certain procedures would no doubt give value to the report. Perhaps some lessons embodying faulty methods might be given with a discussion of why they are considered faulty. Certain other data concerning the recitation besides the verbatim report might also be included. For example, a description of what was done and the manner in which it was done. Notes of this sort might be inserted after the manner of stage directions. The report might well be accompanied by a seating plan of the room and a statement of the distribution of opportunity to recite.

It was the belief of the writer that a good book of this kind would be helpful both to students in training and to teachers in actual service. A teacher of students in training or a supervisor of teachers in service, may indeed seek to impart the principles applicable to different types of lessons without securing the intelligent practice of such principles. Observation of good teaching would of course, be a better means of securing this end, but actual teaching of the kind that is wanted is seldom available. Moreover, the presence of a printed report makes the discussion of the teaching easier than it is when observed teaching must be remembered after the lapse of perhaps a considerable interval.

At any rate, it was thought that if the publication of such lessons supported by notes and critical apparatus and with lesson plans and charts of rooms could be printed and distributed it might be helpful. With this notion in mind an inquiry was made of fifty-five school people in Illinois, twenty-five of whom responded. All said that they thought the project of publishing such lessons would be helpful, and all but one said he could use such a publication personally with his teachers or students. That one said "Probably."

A number of educational people outside of Illinois were also addressed on the question of whether this project was worth while or not. As in the case of the Illinois people, most of them thought the task ought to be undertaken. Some of the correspondents wrote enthusiastically about it.

Largely for lack of sufficient clerical and stenographic help, however, the Bureau has not yet begun actual work on this project. As one looks at it more closely, it evidently involves no small amount of expense. At least two stenographers would have to be present at each recitation; one would record the words of the teacher and pupils in the usual manner. The other would probably have to work with a large chart divided into squares

representing the seats in the room, and would record the words of the pupils in the squares corresponding to their seats. This or some other device would have to be adopted to indicate the identity of the pupils. A single stenographer sitting in a room full of unfamiliar pupils could not be expected to get what was said and identify the row and seat number of the child who said it. An additional observer would probably have to be provided to take account of such things as attitude, facial expression, gestures, illustrative material, black-board work, notes on the text book used, the extent to which the attention of children was held, and the way in which the class-room management proceeded (distribution of material, children passing to the board, etc.) The same observer would indicate the elapsed time for each portion of the recitation period.

Out of all these observations could be drawn up a report which would do something more than is usually attempted in the verbatim reporting of lessons. As a matter of fact—and as some of our correspondents indicated—these reports tend to be rather barren. We think, however, that if they are embellished not only in the ways we have indicated but also by editorial comment and suggestion, they will prove helpful to the student teachers and also to teachers in service. This project will be resumed as soon as we have the competent stenographic and clerical force to handle it.

## CHAPTER III. PROPOSED PROJECTS

The work of the Bureau for the current year naturally includes the continuation of certain projects begun last year. The reader is referred to Chapter II for a statement concerning these projects. In addition, however, to the continuance of projects already initiated, the Bureau has in contemplation the starting of certain new projects; and a statement concerning these projects will form the material of this chapter.

**Project I. Standardization of educational tests.** Before an author publishes a test he submits the material for trial and after eliminating some of it as unsuitable and modifying some of the items in the light of his experience, he brings out the test. He has usually obtained some tentative standards, but the limitation on his time and money prevent his carrying this phase of his work to a conclusion. There is, therefore, no test which does not require after its publication a thorough trial in order to set up norms of performance in terms of it. Many of the older tests have passed through this period and may be said to be satisfactorily standardized.

During the past year certain tests were devised by the Bureau of Educational Research. Certain other tests were taken over for publication and distribution. All of the tests by the Bureau and some of those thus acquired for distribution still stand in need of complete standardization.

The resources of the Bureau are not such that it is able to publish an experimental edition of these tests and distribute it gratis to those who can co-operate in standardization. This is the usual condition. In submitting this project, therefore, of standardization of tests the Bureau is following the customary course. The only difference, however, is that the Bureau is distributing an unusually large number of tests and can therefore offer opportunities for standardizing a rather large variety of different measuring instruments.

On October 6, 1919, Dr. Monroe of the Bureau sent out a circular letter to all the superintendents and school principals who in response to our inquiry last year indicated that they were interested in the study of experimental education and that they were willing to co-operate with each other and with the Bureau in carrying forward such lines of work. In that letter Dr. Monroe offered the services of the Bureau in the tabulation of all returns received and in sending to participants a summary of results.

The following tests were suggested as those which the Bureau desired further to standardize:

1. Buckingham's Scale for Problems in Arithmetic.
2. Monroe's Standardized Reasoning Test in Arithmetic.

3. Monroe's Diagnostic Test in Arithmetic.
4. Harlan's Test of Information in American History.
5. Charter's Diagnostic Language and Grammar Test.
6. Willing's Scale for Measuring Written Compositions.
7. Henmon's Latin Test.
8. Monroe's Standardized Silent Reading Test III.
9. Strach's Physics Tests.
10. Holley's Picture Completion Test for Primary Grades.
11. Holley's Sentence Vocabulary Scale.

It was suggested that those who are interested in participating in this project order material so as to be able to give it during the month of November, 1919, preferably as near the fifteenth of the month as practicable.

**Project II. Collection of information about the usefulness of tests.** A systematic attempt will be made to obtain certain important facts about all the tests distributed by the Bureau. This project is undertaken in order that we may make more rational recommendation to school people. The real value of a test only becomes apparent through its use, and the Bureau will therefore have to rely upon obtaining information from those who purchase the test material and use it in their schools.

Accordingly, with every package of test material sent out by the Bureau, a questionnaire is included in which the recipient is asked to report on the following topics:

1. The time required in scoring the papers.
2. The time required for tabulating the scores and calculating class medians or averages.
3. Any difficulty experienced in understanding directions, either for scoring or for tabulating.
4. The notation of any errors or weaknesses discovered in the test.
5. Suggestions for modification of the test.
6. A statement of how the test has been used to improve instruction.

This last point is the one in which the Bureau is particularly interested. It is evident that unless the tests in some way function to improve instruction their usefulness is questionable.

This material will be gathered throughout the current year and ought to form the basis of an instructive bulletin to be published at the close of the year or at the beginning of next year.

**Project III. Derivation of new test material.** The Bureau announces that it will undertake the derivation of a new algebra test this year. Rugg and Clark's Standardized tests in algebra are being extensively used but are expensive and are becoming more so on account of increased cost of printing. These tests also require a rather large expenditure of time on the part of

both the pupils and teachers. It seems wise, therefore, to attempt the derivation of a simpler and less expensive test.

Supplementary to Buckingham's Scale for Problems in Arithmetic the evaluation of new problems will be undertaken with a view of enlarging the scale and providing alternative forms.

The Bureau also has in contemplation the construction of a "continuous silent reading test." Further announcement concerning this project will be made later.

Superintendents and principals have already been approached on the question of deriving test material in algebra and in arithmetic problems and have generously responded.

**Project IV. Degree of equivalence of the different forms of Monroe's Silent Reading Test.** The three forms of Monroe's Standardized Silent Reading Test were constructed so that they would be exactly equivalent. Since their publication it appears that the intention of the author was realized only approximately. The different forms are now being given to several thousand school children in such a way that the degree of non-equivalence can be ascertained. In case a material difference between the forms is found to exist, it will then be possible to give definite directions for comparing scores obtained from different forms.

**Project V. Analysis of arithmetical abilities and study of pupils' errors.** Fragmentary analyses of the field of arithmetical operations have revealed that there are many arithmetical abilities instead of a single ability. Or to express the same idea in another way, there are many types of arithmetical examples. In close connection with these types of examples are the errors which pupils make. For each type of example there is the possibility of one or more errors peculiar to the type.

The Bureau is undertaking to summarize the work already done on these two related topics and to supplement this by original research where it is needed.

A complete analysis of the operations of arithmetic to determine types of examples is a necessary prerequisite for complete diagnosis. Until we know the types of examples, we cannot ascertain the types of errors which pupils make.

**Project VI. Determination of validity and reliability of educational tests.** For many years workers in the field of educational measurements have been devising tests until we now have several tests for most of the subjects in the elementary school. In this work little attention has been given to questions of the validity and the reliability of the measures which the tests yield. The availability of a number of tests for several of the elementary school subjects makes urgent a scientific determination of the validity and reliability of the respective tests in order that one may have information on which to base a rational selection.

During the past decade the number of educational tests has increased very rapidly and the use of these tests in public schools has also grown by leaps and bounds. The period has been one of remarkable development. However, a survey of these activities reveals the fact that for the most part we are still using without much refinement the same methods of deriving tests as at the beginning of the period. This perhaps has been necessary in the very rapid development, but the time has now arrived when increasing attention should be given to the refinement of our measuring instruments. This is another reason for the scientific study of the validity and reliability of educational tests because out of such studies there will come helpful information concerning possible refinements. During the present year the efforts of the Bureau in respect to this project will be confined for the most part to silent reading. It is hoped in another year to extend it to other fields.

**Project VII. Efficiency of the departmental teaching of mathematics.** This topic was proposed by the mathematics section of the High School Conference. The question at issue is whether the departmental teaching of mathematics is more effective than the teaching of that subject in the regular grade organization. There does not appear to be any adequate published data on the subject. Accordingly, the Bureau is taking up the matter with a number of superintendents and principals in whose schools mathematics is taught as a departmental subject and with others in whose schools mathematics is taught by the grade teachers. The first group of schools will constitute the experimental group and the second the control group.

Obviously a single testing of the performance of children in the departmental schools on the one hand and in the non-departmental schools on the other hand would yield no reliable conclusion as to the efficiency of the teaching in the two systems. It has been decided to limit our study to the seventh and eighth grades. It is clear that children in these grades have received their instruction in mathematics largely in a grade organization. What they know, therefore, and what they can do whether they are now in departmental or non-departmental schools will in either case be largely the product of teaching done in the same type of organization—namely, the grade organization.

We shall, therefore, offer two parallel tests in arithmetic, and we plan to do this at the beginning and at the end of the second semester of work during the current school year. Between the initial test offered in February and the final test offered in June, departmental teaching will be carried on in the experimental schools and grade teaching in the control schools. The difference between the performances of pupils on the initial and final tests will, in a general way, be the product of instruction within the

period. If the improvement is greater in the departmental schools than it is in the grade schools, we shall have one item of evidence as to the superiority of departmental teaching.

There are, however, a number of variable factors which may enter to modify or even invalidate a conclusion based merely upon the relative amount of improvement between the initial and final tests. These variable factors—or at least the most important ones—must either be rendered constant or allowed for. In order to allow for them we must know their amount for the different classes involved in the experiment. These factors relate for the most part to the teacher, the pupil, and the course of study. There are, it is true, some physical factors relating to the schoolroom, the equipment, and supplies. The effect, however, of factors of this sort on the product of instruction over a short period is probably small—at least what evidence we possess seems to indicate that this true.

It is felt, therefore, that if we can take account of differences among the teachers and pupils participating in the experiment and of differences in topics taught, we should go a long way toward refining the gross measures of efficiency of teaching derived from the progress made between the initial and final tests. Accordingly, we propose to secure data concerning the training and experience of the teachers involved in the experiment and a rating of their teaching ability by means of a score card. We propose also to give an intelligence test of a simple kind to all the pupils in both the experimental and control schools who participate in the test. Finally, we shall attempt to sharpen our judgement by obtaining a daily statement from the teachers of the amount of time spent on the most important topics in arithmetic.

**Project VIII. The amount of time spent on topics in arithmetic.** To some extent this project enters into the one we have just described but it will include a large number of schools not involved in the experiment to determine the efficiency of departmental teaching. Moreover, it will be extended to include grades below the seventh and eighth. The plan is to furnish teachers with forms on each one of which may be kept the data for one month at a time. A careful analysis has been made of the topics of arithmetic and provision is made for a column for each day of the month. In these columns the teachers will enter the number of minutes of school time devoted to each topic into which the course in arithmetic has been analyzed.

We do not know how much time is spent in teaching decimals, how much time is spent in reviewing the fundamental operations, how much time is devoted to the teaching of percentage and its application. To be sure we have the statements of courses of study but every one knows that courses of study are not strictly followed, and that whether the course of study mentions reviews or not, every successful teacher is obliged to

spend a large amount of time reviewing work of previous grades. This project will be an attempt to find out the total amount of time actually devoted to the various topics of arithmetic throughout the grades concerned.

**Project IX. The supply of trained teachers and the demand for them.** In connection with the committee on the training of teachers of the High School Conference the Bureau will probably undertake this year a statistical study of the number of new teachers annually required in Illinois for each type of school and for special subjects. With this it is proposed to relate the supply of such teachers furnished by the teacher-training institutions of the state. It is pointed out that we do not know, except in a vague way, how many teachers of each of the different types are needed by the schools. We know that the teaching force as a whole amounts to a certain definite number. We may infer, from our general knowledge as to the rate at which teachers drop out of service, the total number of new teachers annually required. We assume, and probably correctly, that the vacancies are filled, but from what source the teachers come, and to what extent they are adequately trained we do not know. We do not know, for example, how many of the vacancies must be filled by teachers of little or no training because teachers of sufficient training are not available. Again, we do not know to what extent certain types of teaching are over-supplied so that those trained for a given type of service are obliged to teach in other lines in order to obtain positions.

It is not too unreasonable to expect that the state should organize its teacher-training establishment so as to take care of the demand for trained teachers however large it may be in whatever line the demand may exist. Moreover, it is right that the State should know to what extent the teachers trained at its expense render service to the schools of the state after receiving the training.

**Project X. Supplementary study of memory work.** It will be recalled that one of the projects undertaken last year was the determination of standards for memorizing poetry in the grades. Lists of poems agreed upon by the makers of the courses of study, the grouping of these poems into grade lists, and the determination of the amount of memory material usually required—these constituted the objects of the study as it was undertaken last year. This year we are extending the study to include prose selections and proverbs—in fact to cover all the memory work required of children in the elementary school. It is probable that a bulletin on this topic will be published shortly.

**Project XI. The selection of text books.** Mr. A. E. Capps, instructor and graduate student in education, is co-operating with the Bureau in the study of this topic. The project will involve collecting evidence on the methods now employed in

selecting textbooks and the derivation of score cards for judging text books in several of the most important elementary school subjects. In connection with this project and for the broader uses which it may have in every direction, the Bureau is building up a text book library. We are now collecting text books in reading, spelling, geography, and history. These books will be of great value to us in our work. We shall also be able to serve the purposes of the publishers by placing these books on exhibit and making them known to students, faculty members, and school men and women who may use of the facilities of the Bureau.

**Project XII. The extension of Monroe's Silent Reading Test III for use with college students.** In co-operation with Dr. C. W. Stone of the Department of Education, the Bureau is preparing an extension of Monroe Standardized Silent Reading Test III, which is designed for use in the high school, so that it may be more suitable for use with college students. This extension involves the evaluation of a sufficient number of exercises for both forms of the test so that practically no college students will complete the test within five minutes.

**Project XIII. Superintendents' conference.** Last year Dean W. W. Charters proposed the establishment of an annual conference of superintendents to be held at the University as one of the activities of the College of Education. The promoting of this project was placed in the hands of the Director of the Bureau; and he communicated with a large number of superintendents in the state with a view of finding out whether or not a superintendents' conference was wanted and would be supported. The evidence from this inquiry seems to indicate that there is a strong demand for a conference to be organized under the auspices of the College of Education and that a large number of superintendents will be likely to support such a conference by attending and participating in its work.

On October 29th and 30th, 1919, the State School Board Association and the City Superintendents' Association met at the University of Illinois. At that time the Director of the Bureau presented before a joint meeting of the Associations the proposal that the University through the College of Education is making. The Superintendents' Association at its business meeting appointed a committee to consider the action which the association ought to take with reference to this proposal and to report at a meeting to be held in connection with the State Teachers' Association during the Christmas Holidays.

If the superintendents though their association or otherwise continue to manifest an interest in the organization of a conference, it will be the work of the Bureau this year to plan such a conference, arrange a program, engage speakers, and print the proceedings. According to the present indications, the proposed

ors of educational research, and other persons engaged actively in conference, if it is held, will meet during the same week that the High School Conference meets. The first meeting would, then, be held in November, 1920.

**XIV. The Journal of Educational Research.** Beginning in January 1920, the University of Illinois through the Bureau of Educational Research will bring out a new magazine called the Journal of Educational Research. This journal, although it is being promoted by the University of Illinois, will be by no means narrow in its scope. That this is true is clearly shown by the Board of Associate Editors: Leonard P. Ayres, of the Russell Sage Foundation, in charge of child accounting; W. W. Charters, of the Carnegie Institute of Technology, in charge of Curriculum Analysis; S. A. Courtis of the Detroit Public Schools, in charge of Supervision and Bureau Organization; Walter S. Monroe of the University of Illinois, in charge of Educational Tests and Measurements; George D. Strayer, of Teacher's College, Columbia University, in charge of Educational Finance, Buildings and Building Programs, Records and Reports; and Lewis M. Terman of Leland Stanford Jr. University, in charge of Intelligence Tests.

In addition to the associate editors, there is also a large Board of Contributing Editors consisting of a number of direct in research work.

While the journal will not entirely avoid theoretical and technical articles, it will especially emphasize the practical application of the results and methods of educational research. To the actual worker in the schools it seems that investigation of educational questions has been overloaded with theory. Of course it is a fact that the practical bearings and implications of these theoretical statements are very numerous, and it is to the task of showing these bearings and making these implications explicit that the Journal of Educational Research will be devoted. How the teacher and the supervisor can utilize the results of the experimentalist, what methods may be transferred from the laboratory to the schoolroom and the school office—these are the questions with which the new journal will be especially concerned.

No small amount of the energies of the director of the Bureau—who is also editor in chief of the journal—and no small amount of the energies of the employees of the Bureau will be directed to furnishing the editorial supervision of this magazine. It will be their endeavor to make it the highest and best expression of the service which educational investigators can render to the public schools of the nation.

## CHAPTER IV. THE WORK OF THE LIBRARY DIVISION.

**Need for a library division.** As our relations with the public schools of the State have become closer, the tendency for superintendents and principals to refer matters to us for decision and to seek information from us has increased. No small part of our time is at present occupied in supplying information to school people. This type of service, therefore, while it has already assumed rather large proportions may be expected to absorb an even greater portion of the time and energy of the employees of the Bureau during the present year.

As has been indicated elsewhere, an extensive correspondence is carried on with users of test material. The questions that are asked of us in connection with this work are very numerous and require a great deal of thought on the part of both the administrative and clerical staff of the Bureau.

It is not, however, of this work that we wish to speak in this chapter. The need for advice, information, and evidence on numerous topics concerned with the work of the schools has necessitated our setting up in the Bureau a rather extensive and somewhat peculiar library. There are very few bound books in this library. By the time educational material has reached the stage of being put into such books, it has become easily available in general libraries. The need, therefore, for an extensive collection of bound volumes has not been felt.

**Organization and routine.** The library of the Bureau consists of pamphlets, bulletins, reports, and periodicals—in short, of that type of material known to librarians as ephemeral. The kind of material contained in these volumes is various but a large part of it may be classified as consisting of courses of study, school laws, annual reports of boards of education, reports of surveys, proceedings of learned societies, publications of educational foundations, and bulletins of research departments and of other educational organizations. A practically complete file of the bulletins of the Federal Bureau of Education is available. The material in the library now consists of about 3050 titles, to which should be added the fifty-nine periodicals which the Bureau regularly receives.

Perhaps there is nothing remarkable about the material of which the library consists. Many other libraries doubtless have much the same collection. But in most cases of which the writer has information the material is practically worthless because no one knows what it contains. It has, therefore, been the problem of the Bureau to make this material as useful as it is capable of being. As volumes and pamphlets come in, they are first accessioned, classified, and catalogued. This involves making of author and title cards as well as subject cards. The

material—bulletins, reports, etc.—is itself arranged according to a fixed classification which has reference to the issuing body and the purpose of the publication.

But this is not all. Each article is read and analyzed according to a classification of educational activities, prepared for the purpose. For each topic treated in the volume in question, a card is made with page references. Not infrequently from one to two hundred topical cards are thus made with reference to a single report.

In addition to this topical index, all references to the use of tests are noted and in each case two cards are made, one for the test and the other for the city or geographical division where the test was used. For example if it is found from the report of the Board of Education of Des Moines, Iowa, that the Courtis Arithmetic Test, Series B, has been used, two cards are made. One says "Courtis Standard Research Tests in Arithmetic, Series B, used at Des Moines, Iowa," followed by the title of the report and the page reference. The other card will say, "Des Moines, Iowa, used Courtis Standard Research Test in Arithmetic, Series B," again followed by the name of the report and the page reference. Thus, as far as published reports are concerned, a person who consults our files may find out where each educational or mental test has been given. He may also learn what tests have been used in each city.

**Bibliographical service.** But this organization of the library material is only justified by the use that can be made of it. We receive, as has been said, many requests for information from the school people of the state. In responding to these requests the resources of the Bureau Library are drawn on through the use of the index and filing cards mentioned above. In addition, however, to the utilization of the material belonging to the Bureau Library, we also use (especially for material published in bound volumes) the larger resources of the University Library.

The following are some of the bibliographies which have been prepared by the library division of the Bureau. We use the term bibliographies because it covers perhaps more appropriately than any other single word the type of response to inquiries which we are listing below. Not infrequently the bibliography is largely annotated and in some instances our response consists of a series of suggestions drawn from a large numbers of sources which are not always indicated. The reader's attention is called to the nature of these bibliographies. Copies of them are on file in the Bureau; and if the reader of this bulletin is interested, he may obtain the same information by addressing the Bureau.

#### LIST OF BIBLIOGRAPHIES PREPARED BY THE BUREAU

1. Select bibliography on the democratization of the school.

2. Select bibliography on promotions, percentages or failures and withdrawals.
3. Select bibliography on mental testing.
4. A list of school reports containing material on the junior high school.
5. Select bibliography on the judgement of textbooks.
6. Select bibliography on programs for parents-teachers associations.
7. Games for recess. A list of books containing suggestions,
8. Vocational guidance. A bibliography.
9. Supplementary material for the teaching of Caesar.
10. Select bibliography on the question of a Federal Department of Education.
11. Books and pamphlets explaining the grouping of grades; 8-4 plan, 6-6 plan, and the 6-3-3 plan.
12. A brief bibliography on "How to deal with pupils below the average."
13. A brief bibliography on "How to deal with pupils above the average."
14. What experiments have been tried in segregation with respect to ability.
15. A brief bibliography on curriculum reconstruction due to the war.
16. Suggestive supplementary material for ancient history.
17. A bibliography on making programs for high school.
18. Community activities centering in and about the high school.
19. Lists of books suitable for children in different grades.
20. A brief biography of the rating of teachers.
21. A biography on the derivation and the use of score cards.
22. Data concerning an all-year-round school. Based on school reports.
23. Bibliography on project teaching in the grades.
24. A bibliography on a point system for extra-classroom activities in high schools.
25. A bibliography on marking systems.
26. Brief bibliography on the departmental plan in the grades.
27. Courses of study containing problems in geography.
28. Suggestions on supplementary material for English history.
29. Suggestions on supplementary material for geometry.
30. Suggestions on teaching high school Latin.
31. Suggestions on supplementary material for high school history.
32. Suggestions on a curriculum for the junior high school in a city having a population of five or ten thousand.

33. A brief bibliography and notes from state laws relating to compulsory education.
34. A bibliography on the relation between quality of teaching and teaching experience.
35. A brief bibliography on building and equipment.
36. Bibliography on credit for quality.
37. The public school as an agency in the growth and development of a democracy. A bibliography.
38. Suggestive reading on vocational guidance.
39. An outline for the study of tests and measurements for high school use.
40. A bibliography on the desirable outcomes from the teaching of history.
41. When should the introduction of formal arithmetic in the grades take place.
42. A bibliography on the project method and socialized recitation in the high school.

**An elementary school textbook library.** We have lately begun to collect a textbook library. People engaged in school work often write to us about textbooks and call upon us to discuss textbooks. If we had immediately at hand a competent textbook library we could use it to advantage. Moreover, some of the research problems with which the Bureau is dealing and will deal in the future, involve the use of textbooks. So far we have only thought to obtain textbooks in elementary school subjects. A good library of high school textbooks is maintained in the office of the High School Visitor. Moreover, we have not hitherto had frequent occasion to consult such books. We have begun by collecting the best currently used textbooks in reading, arithmetic, spelling, geography, and United States history. We now have about four hundred volumes and the number is growing rapidly.

In the service work which the Bureau will do in the future the reference library and the textbook library will play an important part. The reference library will help us to place at the disposal of school people types of material not readily accessible, while the textbook library will enable us to converse with the school people in a common language.

## CHAPTER V. MEASURING THE RESULTS OF TEACHING FOR THE PURPOSE OF IMPROVING INSTRUCTION

The use of educational tests should result in an improvement of the instruction. They are, however, not drill exercises nor teaching devices. Pupils will derive little or no benefit from being "exposed" to the tests. In order to understand how educational tests may be used to improve instruction, it is necessary to have in mind certain things concerning their nature.

**What standardized tests are.** Educational tests differ from examinations such as teachers prepare in three respects: *First*, the questions or exercises have been scientifically selected with respect to the purpose which the test is designed to fulfill. *Second*, the exercises have been arranged according to certain principles of scale construction so as to form a scientific measuring instrument. *Third*, the test, or scale, has been *standardized*, that is, the score which pupils in the several grades, in which the test is given, make, has been determined. Such a score is called a standard score and the test is spoken of as a *standardized test*.

**Diagnostic vs. general tests.** Each school subject includes a number of abilities which are specific or distinct from each other to a considerable degree. By this statement we mean that in the operations of arithmetic, for example, a pupil may be able to do short-column addition (three or four figures) satisfactorily when he is conspicuously below standard in ability to do long-column addition (thirteen or more figures). In spelling, a pupil may be able to spell correctly certain words and at the same time misspell other words which in general are not more difficult. In fact it has recently been shown that each derived form of a word constitutes a distinct spelling problem.

*A diagnostic test* is one which furnishes a separate measure of each specific ability in the field of the test or at least of the important abilities. An excellent illustration of a test which does this is Charters' Diagnostic Language Test for Pronouns. Since the field of pronouns is limited, a scientific survey was made to determine what were the common errors in the use of pronouns. The test includes all the errors which were found and gives information whether or not the pupil is able to correct each error. Since the test completely covers the field of pronouns, it gives a complete *diagnosis* of the pupil's language abilities so far as pronouns are concerned.

*A general test* is the opposite of diagnostic test. It yields average or composite measures in which the magnitude of the individual abilities are lost sight of. An excellent example of a general test is the Courtis Supervisory Test in Arithmetic. This is a single test covering the entire field of all

the operations with integers. The test gives only the pupil's general or average standing. It tells nothing about his specific weaknesses.

Some tests are partly diagnostic and partly general. This is true of such a test as the Courtis Standard Research Test, Series B. It is diagnostic to the extent that it yields separate measures for the four operations and for integers only, but is general for each operation.

Certain tests are general or diagnostic, depending upon the way in which the facts secured by giving the test are tabulated. Charters' Diagnostic Language Test for Pronouns, referred to above, is diagnostic only when the facts of the tests are arranged to show diagnosis. They may be arranged to show only a general score.

**How standardized tests are helpful in improving instruction.** Standardized tests render assistance to the teacher in three ways: *First*, since the test has been constructed after a careful analysis and survey of the field, it gives the teacher a list of the things which the pupil should be able to do. This is well illustrated by the Ayres' Spelling Scale which contains the 1,000 most frequently used words, and by Monroe's Diagnostic Tests in Arithmetic which give a list of the significant types of examples in certain fields. *Second*, since the tests are *standardized*, the teacher may know just what scores pupils in general make. In other words, the teacher is given a definite objective aim to strive for in her teaching, an aim which the pupil can understand. The advantage of a definite standard is obvious. *Third*, tests furnish the teacher with information concerning the abilities of her pupils. They point out phases of strength and weakness. With this information at hand she can plan instruction which will be more efficient since it will meet specific needs.

Since diagnostic tests furnish more detailed information than general tests do, it follows that they are more helpful in improving instruction. This point will be referred to again under the head of "How to Choose a Standardized Test."

**Service of the Bureau of Educational Research.** Because the Bureau of Educational Research believes that standardized tests are effective instruments for improving instruction, certain facilities have been provided for assisting superintendents and teachers in their use.

1. A prerequisite to the use of standardized tests is that they may be easily obtained. In order that the tests listed on the following pages may be readily accessible to the educational public, the Bureau of Educational Research maintains a stock of them and sells them at cost; consequently it is unnecessary to write to the different individual publishers in order to secure the tests recommended for use.

2. A test cannot be conveniently used unless it is accompanied by complete directions for giving it, scoring the test papers, and tabulating the scores. Further, educators must have record sheets adapted to the recording of the scores. Every test listed for sale by the Bureau is provided with the needed accessories. In order to render this service it has been necessary in some cases for the Bureau of Educational Research to arrange directions and devise record sheets because some authors of tests have not provided these aids.

3. The best available standards are either printed on the class record sheet or are given on a separate sheet. In the case of tests that are just being standardized the purchaser can secure the standards as soon as they are available by writing to the Bureau of Educational Research.

4. The standardized tests listed on the following pages are accompanied by two record sheets for each class of 25. One record sheet will be printed on blue paper and marked "duplicate." Those who purchase test materials are requested to make out a duplicate at the same time that the original class record sheet is compiled and return it to the Bureau of Educational Research. The Bureau sells all its test materials at cost and in return for this service cooperation is asked from those who purchase the materials. From these class record sheets summaries will be prepared at the end of the school year and sent to those who have contributed results. By means of these summaries, school people will be able to compare their average or median scores with similar scores of other cities as well as with the state standards.

5. The value of standardized tests is realized through the use that is made of the scores. They must be *interpreted in terms of the needs of the pupils for instruction*. This means doing more than simply ascertaining whether the scores are above standard, at standard, or below standard. It means doing much the same sort of thing the physician does after he has ascertained his patient's pulse rate, temperature, and other symptoms when he prescribes treatment. The physician interprets or translates the facts or measures of his patient's condition in terms of his needs for treatment. Because the Bureau of Educational Research believes that this step is necessary for the effective use of standardized tests, it is prepared to render assistance in the interpretation of scores. Helpful suggestions will be found in the literature suggested below as references for the tests, and in general manuals.\*

\*Monroe, Walter S. "Measuring the Results of Teaching," Boston: Houghton-Mifflin Co., 1918.

Starch, Daniel "Educational Measurements," New York: MacMillan, 1916.

Monroe, Walter S., De Voss, James C., and Kelly, Frederick J. "Educational Tests and Measurements." Boston: Houghton-Mifflin Co., 1917.

6. The Bureau of Educational Research will carry on investigations in order to improve existing tests and to devise new ones. The cooperation of teachers and superintendents is solicited.

**How to choose a standardized test.** Several standardized tests are available for most school subjects and for this reason it is necessary to make a choice. The list of standardized tests given on the following pages does not include all available tests. A first or preliminary selection has been made, but it has been thought advisable to list several tests for most of the school subjects. Hence, it is necessary to make another selection from this list. Sufficient information is not yet available to enable one to make a scientific selection; but it will be helpful for the superintendent or teacher to have certain criteria in mind.

1. The use of a standardized test should result in the improvement of instruction, and this is accomplished by means of the information which the test yields concerning the abilities of the pupils. *Diagnostic tests* furnish more information than *general tests*. Hence, if other things are equal, a diagnostic test is to be preferred to a general test, unless the test is being used merely for administrative purposes.

2. All tests do not yield the same kinds of information. *Difficulty tests* show hard the exercises are that the pupils can do. *Rate tests* show how rapidly and how well they can perform the tasks. Other tests show only how well pupils can do certain kinds of exercises. Standardized tests should be selected with reference to the kind of information which is most important for the purpose in mind.

3. An important consideration is that the test should be easy to use. Further, it should not require a large expenditure of time in the giving or in the scoring and tabulating of results. The use of a standardized test is not complete when the scores are recorded on the class record sheet and the class scores calculated. There remain *two* important steps: *First*, the interpretation of the results in terms of pupils needs; and *Second*, the planning of corrective instruction to remedy deficiencies. If a large amount of time is consumed in giving the test, in scoring and in tabulating, the subsequent steps are likely to be omitted.

## CHAPTER VI. STANDARDIZED TESTS FOR THE ELEMENTARY SCHOOL

In this and the following chapters will be given in schematic form the most salient facts concerning those tests in school subjects which the Board of Educational Research will carry in stock and will sell at the prices quoted. Many of these instruments of measurement are made up of a series of tests. In these chapters each of these groups of questions or tests is called a test. Thus, the publication known collectively as "The Cleveland Arithmetic Test" consists of 15 subordinate tests; the Courtis Standard Research Test, Series B, is composed of 4 tests, etc.

In many instances authors have published two or more measuring instruments of the same kind and of the same difficulty, but consisting of entirely different material. Each of these publications is called in these chapters a *form* of the test in question. Thus, there are four forms of the Courtis Standard Research Test, Series B. Either of these forms may be used to measure the same sort of ability, and scores obtained through the use of one of these forms are regarded as having the same meaning as scores obtained in the use of either one of the other three forms.

### ARITHMETIC

**I. Buckingham Scale for Problems in Arithmetic.** 1. *Description.* This scale consists of three divisions called Division 1, Division 2, and Division 3 which are designed for different grades. Each division consists of ten problems evaluated in terms of difficulty. Difficulty is understood to mean the difficulty of getting the correct answer. This scale provides material for testing grades three to eight.

2. *Function.* This scale is intended to be used in estimating the ability of children to solve such types of problems as are usually met in courses of study for elementary schools. In spite of emphasis upon the teaching of problems, it appears that the ability of children to read, understand, and successfully deal with the situations presented in verbal problems is rather small. The extent to which this is true in each school may be determined by the use of this scale.

3. *Time Required.* Pupils are to be given all the time they can use profitably. It is suggested, however, that a test should not last more than an hour in any case.

4. Test 1 is for use in grades 3 and 4, Test 2 and grades 5 and 6, and Test 3 in grades 7 and 8. The problems in Test 3 are in most cases, sufficiently difficult for use in the high school.

5. One test is required for each pupil. In ordering specify the number of pupils to be tested in each grade. Other forms will follow.

6. *References.* None are available.

7. *Price:* Including class record sheets and directions, 70 cents per hundred, Postage extra.

**II. Cleveland Survey Arithmetic Tests.** 1. *Description.* This series of tests on the operations of arithmetic was first used in the Cleveland survey, and since then has been used widely. There are fifteen tests in the series, each composed of different types of examples with integers or common fractions. Only two of the tests are devoted to fractions.

2. *Function.* This series of tests yields measures of the rate and accuracy with which pupils are able to do certain types of examples. The series of tests has been called spiral because the abilities of the pupils are measured on successive levels of difficulty. The series is diagnostic rather than general.

3. *Time Required.* The total working time for giving the series is 22 minutes. The Bureau of Educational Research (which has taken over from the University of Chicago the distribution of the Cleveland Arithmetic Tests) has devised a folder containing directions, standards, answers, and class score sheet which will facilitate the administration and scoring of the tests.

4. The series can be used in grades 3 to 8 inclusive, although some of the tests are too difficult for the pupils in the lower grades.

5. In ordering give the number of pupils to be tested. There is only one form of the test.

6. *References.* Judd, Charles H.: "Measuring the Work of the Public Schools," New York, Russell Sage Foundation, 1917; Counts, G. S.: "Arithmetic Tests and Studies in the Psychology of Arithmetic," Supplementary Educational Monographs, v. 1, no. 4, Chicago, University of Chicago Press, 1917; O'Hern, J. P.: "The Practical Application of Standard Tests in Spelling, Language, and Arithmetic," Elementary School Journal, 18: 662-679, May, 1918.

7. *Price:* Including complete directions and class record sheets, \$1.90 per hundred. Postage extra.

**III. Courtis Standard Research Tests, Series B.** 1. *Description.* These are the well-known Courtis Arithmetic Tests. The series consists of four tests, one on each of the operations with integers.

2. *Function.* This series of tests yields measures of the rate and accuracy with which pupils can do one type of example in each of the four fundamental operations with integers but in each case the type of example has been so chosen as to include all other types. The tests are general in the field of each operation but diagnostic to the extent that information is secured for each fundamental operation.

3. *Time Required.* The total working time for giving the four tests in 26 minutes. The test papers of a class of 40 pupils can be scored and the scores tabulated in two hours.

4. Series B is recommended for use in grades 4 to 8 inclusive.

5. There are four forms of the test. During the school year of 1919-1920 the Bureau of Educational Research will carry in stock only Form 1 and Form 3. In ordering, the form desired should be specified and the numbers of pupils should be given.

6. *References.* The various annual accountings published by Mr. Courtis and his *Manual of Instruction for Giving and Scoring the Courtis Standard Tests*; Monroe, Walter S.: "A Report of the Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities," Emporia, Kansas, Bureau of Educational Measurements and Standards, 1915; "Arithmetic—The Courtis Standard Tests in Boston, 1912-1915. An Appraisal," Boston, Department of Education Investigation and Measurement, 1916; Haggerty, M. E.: "Arithmetic: A Co-operative Study in Educational Measurements," Indiana University Bulletin, Studies, No. 27. University of Pennsylvania Schoolmen's Week Proceedings, p. 97ff, 114ff, 203, April 11-13, 1918.

*Price:* Including complete directions and class record sheets, \$1.00 per hundred. Postage extra.

**IV. Monroe Diagnostic Tests in Arithmetic.** 1. *Description.* Tests 1 to 11 are on the operations with integers, tests 12 to 16 are on common fractions, and tests 17 to 21 are on decimal fractions.

2. *Function.* As the title indicates, the function of this series of tests is to yield diagnostic measures of arithmetical abilities in terms of rate and accuracy. They do this more completely than do the Cleveland Survey Arithmetic Tests. With the exception of the operations with mixed numbers the diagnosis is practically complete.

3. *Time Required.* The total working time for the 21 tests is 30 minutes. Answers, directions, and record sheets are furnished with the tests so that the time for scoring and tabulating is reduced to a minimum.

4. Tests 1 to 11 can be given in grades 4 to 8, tests 12 to 16 in grades 5 to 8, and tests 17 to 21 in grades 6 to 8.

5. Only one form of the tests is available. In ordering, specify the particular tests desired and give the number of pupils in each grade.

6. *References.* Monroe, Walter S.: "A Series of Diagnostic Tests in Arithmetic," The Elementary School Journal, vol. XIX, no. 8, April, 1919.

7. *Price:* Including complete directions and class record sheets, 70 cents per hundred each part. Postage extra.

## V. Monroe Standardized Reasoning Tests in Arithmetic.

1. *Description.* The tests consist of list of problems which have been carefully selected as being representative of the one and two-step problems of our arithmetic text books. The problems are so arranged that the pupil can do all of his work on the test paper.

2. *Function.* These tests are designed to measure the ability of the pupil to reason apart from his ability to perform the operations required in solving a problem. Each pupil receives a score for correct reasoning (correct principle) and another for performing the operations correctly (correct answer). The tests are general in the field of solving one and two-step problems.

3. *Time Required.* For giving the test 25 minutes are required. The scoring of the test papers and the recording of the scores for a class of 25 pupils can be done in one and one-half hours.

4-5. Test I is for grades 4 and 5, Test II is for grades 6 and 7, and Test III is for grade 8. There are two forms. In ordering indicate the number of pupils in each grade, and specify the form desired.

6. *References.* Monroe, Walter S.: "The Derivation of Reasoning Tests in Arithmetic," School and Society, 8:295, 324, September 7, 14, 1918.

7. *Price:* Including complete directions and score sheets, 65 cents per hundred. Postage extra.

## VI. Woody Arithmetic Scales, Series B.

1. *Description.* These scales are four in number, one for each of the fundamental operations. Each consists of examples arranged in the order of increasing difficulty.

2. *Function.* The scales are useful in providing a general showing for a class or school. They also furnish considerable information relative to the abilities of the different children tested. The scores obtained from this series may be recorded so as to yield a diagnosis in so far as the types of examples are represented.

3. *Time Required.* Each scale requires 10 minutes for its administration. The time required in scoring is about the same as that required to mark the same number of arithmetic papers.

4. The series can be used in grades 3 to 8 inclusive. They are not so useful in the lower grades, however, because but few examples are offered which the children can do.

5. Only one form of the test is offered. In ordering, give the number of pupils to be tested, and the fundamental operations in which tests are desired.

6. *References.* Woody, Clifford: "Measurements of Some Achievements in Arithmetic," New York, Teachers College, Columbia University, 1916; Anderson, C. J.: "The Use of the

Woody Scales for Diagnostic Purposes," Elementary School Journal, 17:770-781, June, 1918; Monroe, Walter S.: "Experimental and Analytical Study of Woody's Arithmetical Scales, Series A," School and Society, 6:412-420, October 6, 1917; Theissen, W. W. and Fleming, Cecile White: "The Diagnostic Value of the Woody Arithmetic Scales. A Reply," Journal of Educational Psychology, vol. IX, 475-488; 567-580, November and December, 1918; Theissen, W. W.: "A Report on the Use of Some Standard Tests for 1916-1917," Madison, Wisconsin, State Department of Public Instruction, 51-70, 1918. See also Research and Measurement Bulletin No. 2, Pittsburgh, Pa., January, 1918.

7. *Price*: Including directions and class score sheet, 50 cents per hundred each part. Postage extra.

#### GEOGRAPHY

##### I. Courtis Standard Supervisory Test in Geography.

1. *Description*. This test includes only the states and important cities of the United States. A pupil's knowledge of these is tested by his ability to locate them on the outline map.

2. *Function*. The function of this test has been indicated in its description. Its measures the rate and accuracy with which the pupil can locate the states and 30 important cities.

3. *Time Required*. Six minutes are required for giving the test. It is so arranged that the scoring of the papers and the recording of the scores can be done quickly.

4. This test may be used in any grade after the pupils have studied the United States.

5. The same test is used in all grades and only one form is carried in stock. In ordering, give the number of pupils to be tested.

6. *References*. Courtis, S. A.: Measuring the Effects of Supervision in Geography, "School and Society, 10:61-70, July 19, 1919.

7. *Price*: Including directions and class record sheets, \$1.00 per hundred. Postage extra.

##### II. The Hahn-Lackey Geography Scale. 1. *Description*.

This scale consists of 217 carefully selected questions classified according to difficulty and standardized for the several grades. The material covered by the questions is common to six modern texts.

2. *Function*. This scale is not a test. Its function is simply to provide the teacher with a carefully selected list of standardized questions from which she can construct a standardized test.

3. *Time Required*. The time required for giving a list of questions selected from this scale will depend upon the number of questions but is will not be greater than is necessary for an

equal number of questions prepared by the teacher. In fact it will in general be less because these questions have been formulated for the special purpose of measurement. The scoring and recording of scores is facilitated by a score card and record sheet.

4. It may be used in grades 4 to 8.
5. Only one scale is needed for each teacher. One class record sheet is needed for each grade. Give the number of copies of the scale and the number of class record sheets desired.
6. *References.* Lackey, E. E.: "A Scale for Measuring the Ability of Children in Geography," *Journal of Educational Psychology*, 9: 443-451, October, 1918; Report of the Superintendent of Schools, Board of Education, Lincoln, Nebraska, p. 103, 1915-1917.
7. *Price:* Including complete directions and one class record sheet 10 cents each, extra class record sheets, one cent each. Postage extra.

#### HANDWRITING

##### I. Ayres Handwriting Scale, "Gettysburg Edition."

1. *Description.* This is the latest edition of Ayres' handwriting scales. Numerous changes have been introduced which make it a more accurate instrument than the "three slant edition." It uses the first three sentences of the "Gettysburg Oration" as copy material.

2. *Function.* This scale is designed to yield a general measure of the quality of handwriting. The directions for securing a sample of the pupil's handwriting also provide for measuring the rate at which he writes.

3. *Time Required.* For collecting samples of handwriting only two or three minutes are required. The rating of the samples by means of the scale requires more time although they may be rated rapidly. For one inexperienced in using the scale a period of practice is recommended before attempting to make final ratings.

4. The scale may be used in all grades in which handwriting is taught.

5. Only one scale is needed for each teacher. One class record sheet is needed for each class. Give the number of scales and class record sheets desired.

6. *References.* Breed, F. S.: "The Comparative Accuracy of the Ayres' Handwriting Scale, Gettysburg Edition," *Elementary School Journal*, 18:458-463, February, 1918; Report of the Superintendent of Schools, Huron, South Dakota, pp. 60-64, 1916-1917.

7. *Price:* Including one class record sheet, 7 cents each, extra class record sheets, one cent each. Postage extra.

## II. Freeman Chart for Diagnosing Faults in Handwriting.

1. *Description.* This scale consists of samples arranged according to merit under each of five headings, namely; (1) uniformity of slant, (2) uniformity of alignment, (3) quality of line, (4) letter formation and (5) spacing. Three degrees of each of these characteristics are included in the scale. They are numbered 1, 3, and 5. The intermediate values 2 and 4 may be used.

2. *Function.* As its name implies, this scale is to be used for the purpose of diagnosis. In this respect it is a sharp contrast with both Ayres' Scale and Thorndike's Scale.

3. *Time Required.* The time required for rating samples is of course greater than that required by the Ayres' Scale since each example is rated on five different scales. However, it is recommended that this scale be used only when a sample of handwriting is below standard and one desires to ascertain its particular faults.

4. The scale may be used in all grades in which handwriting is taught.

5. Only one scale is needed for each teacher. Give the number of scales desired.

6. *References.* Freeman, F. N.: "The Teaching of Handwriting," Riverside Educational Monographs, Boston, Houghton-Mifflin Co.; Freeman, F. N.: "Handwriting," Survey of the St. Louis Public Schools, St. Louis Board of Education, 1917; Freeman, F. N.: "Handwriting Test for Use in School Surveys," Elementary School Journal, 16: 299-30, February, 1916; Freeman, F. N.: "An Analytical Scale for Judging Handwriting," Elementary School Journal, 15:432-441, April, 1915.

7. *Price:* Including complete directions, 30 cents each. Postage extra.

III. Gray Standard Score Card for Measuring Handwriting. 1. *Description.* This represents a different type of measuring instrument. It is similar to the score cards which have been used successfully by agriculturists. Nine characteristics of handwriting are considered separately and a specified number of points are allowed for perfection in each. There are four forms of the score card. Form I for individual practice, Form II for actual work in the judgment of handwriting of pupils, Form III class score card for displaying class scores, Form IV a score card for reporting to parents.

2. *Function.* This scale is both diagnostic and general. The total score is a general measure and the scores for separate characteristics are diagnostic measurements.

3. *Time Required.* Exact data are not available on this point, but it is probable that more time will be needed to judge handwriting on this scale than to rate it with any of the other measuring devices.

4. This scale may be used in all grades in which handwriting is taught.

5. One copy each of Form II and of Form IV are needed for each pupil in the class. One copy of Form III is sufficient for the entire class. Only the number of copies of Form I that are to be used for practice need be ordered.

6. *References.* Gray, C. Truman: "Score Card for the Measurement of Handwriting" Bulletin of the University of Texas, No. 37, Austin, Texas, 1915.

7. *Price:* Including complete directions: Forms I and II, 50 cents per hundred; Form III, 10 cents each; Form IV, 30 cents per hundred. Postage extra.

**IV. Thorndike Handwriting Scale.** 1. *Description.* This scale consists of a series of samples of handwriting arranged in order of general merit.

2. *Function.* This scale is designed to yield a general measure of the quality of handwriting. The directions for securing a sample of a pupil's handwriting provide also for measuring the rate at which he writes.

3. *Time Required.* For collecting samples of handwriting only two or three minutes are required. The rating of the samples by the scale requires more time although they may be rated rapidly. For one inexperienced in using the scale, a period of practice is recommended.

4. This scale may be used in all grades in which handwriting is taught.

5. Only one scale is needed for each teacher. One class record sheet is needed for each grade. Give the number of scales and class record sheets desired.

6. *References.* Thorndike, E. L.: "Handwriting," Teachers College, Columbia University, 1910; Thorndike, E. L.: "Teachers' Estimates of the Quality of Specimens of Handwriting," Teachers College Record, 15:279-291, November, 1914; "A Review of the Rockford Public Schools," Rockford, Illinois, Board of Education, pp. 57-60, 1916; "Annual Report of the Des Moines Public Schools," pp. 80-85, 1915; "Bulletin No. 1 Bureau of Research and Efficiency," Kansas City, Missouri, pp. 34-64, 1916.

7. *Price:* Including complete directions and one class record sheet, 10 cents each, extra class record sheets, one cent cents per hundred. Postage extra.

#### HISTORY

##### **I. Harlan Test of Information in American History.**

1. *Description.* This is an information test in American history. It consists of 10 exercises based on an analytical study of text-books in American history.

2. *Function.* This test gives the teacher a measure of the efficiency with which the information side of American history has been taught.

3. *Time Required.* Most pupils finish the test within 25 minutes. The scoring of the papers can be carried on rapidly because the material is so arranged that the scoring time is reduced to a minimum.

4. This test is best suited for use in the grammar grades. It may be used in lower grades where history has been taught and in some cases in the first year of high school.

5. There is only one form available. One copy is needed for each pupil. Give the number of pupils to be tested.

6. *References.* None available.

7. *Price:* Including complete directions and score sheets, 75 cents per hundred. Postage extra.

**II. Sackett Scale in United States History.** 1. *Description.* This scale is composed of seven different tests based on carefully selected information in United States history.

2. *Function.* This test gives a general measure of the grasp of the information side of United States history.

3. *Time Required.* This test requires exactly 39 minutes of working time for the pupils. The scoring of papers would require about the same.

4. This scale can be used with pupils who have studied history above the sixth grade. It is difficult enough to test most high school and college students.

5. One copy of the test is needed for each pupil in the class. Give the number of pupils to be tested.

6. *References.* Bell, J. C. and McCollum, D. F.: "A Study of the Attainments of Pupils in United States history," *Journal of Educational Psychology*, 8:257-274, May 1917.

7. *Price:* Including class record sheets, \$2.00 per hundred. Postage extra.

#### LANGUAGE, COMPOSITION AND GRAMMAR

##### I. Charters Diagnostic Language and Grammar Tests.

1. *Description.* These tests have been formed from material gathered in a study of oral errors in English made by the school children in Kansas City and Detroit. There are separate editions for (a) language and (b) language and grammar. The language tests are four in number, Pronouns, Verbs A, Verbs B, and Miscellaneous. There are three language and grammar tests, Pronouns, Verbs A and Miscellaneous. In the language tests the word forms are presented in sentences some of which are right and some of which are wrong. The children are instructed to supply the correct word forms. In the grammar tests they are asked to give the grammatical rule upon which the correct form is based.

2. *Function.* As the titles indicate, the purpose of these tests is mainly diagnostic. The teacher is able to ascertain the particular language errors, which the children are unable to correct or for which they cannot give the rule upon which the correction is based. The tests have also a general function.

3. *Time Required.* It has been found that it requires from 15 to 25 minutes for the children to complete one of the language tests. The time required in the scoring of the test is approximately equivalent to that required to mark 40 sentences in language. The language and grammar tests require more time.

4. The language tests may be used in grades 3 to 8 inclusive. The language and grammar tests are not suitable for use below the seventh grade.

5. One test is required for each pupil in the grades. There are two forms of each test. Indicate clearly the form and edition (language, or language and grammar) of the tests desired.

6. *References.* None available.

7. *Price:* Including complete directions and score sheets, 55 cents per hundred for language edition of any test; \$1.15 per hundred for the language and grammar edition.

## II. Nassau County Supplement to the Hillegas Scale.

1. *Description.* This scale is a simplification and improvement of the original Hillegas Composition Scale. It consists of a series of compositions written under controlled conditions and arranged in order of general merit.

2. *Function.* This scale was designed to yield a measure of the general merit of compositions written under standard conditions.

3. *Time Required.* Eighteen minutes are allowed for writing the compositions. The rating of the compositions by means of the scale requires no more time than is usually required for "grading" compositions. The length of time required can be reduced by practice. As experience increases the work will be done more accurately.

4. This scale may be used in grades 4 to 12 inclusive.

5. Only one scale is needed for each teacher. One class record sheet is needed for each grade. Give number of scales and class record sheets desired.

6. *References.* Hillegas, M. B.: "A Scale for the Measurement of Quality in English Composition by Young People," Teachers College Record, 13: 331-384, September, 1912; Trabue, M. R.: "Supplementing the Hillegas Scale," Teachers College Record, 19:51-85, January, 1917; Theissen, W. W.: "Improving Teachers' Estimates of Composition Specimens with the Aid of the Trabue Nassau County Scale," School and Society, 7: 143-150, February, 1918; Strayer, G. D.: "Some Problems in City School Administration," pp. 155-163, Yonkers-on-the-Hudson, New York, World Book Co., "The Composition Tests," Report of a Survey of the School System of St. Paul, Minnesota, 1917,

pp. 436-481; Parker F. E. and Courtis, S. A. "The Value of Measurements," English Journal, 8: 203-208, April 1919.

7. *Price*: Including complete directions and score sheets, 10 cents each, extra class record sheets, one cent each. Postage extra.

**III. Starch Punctuation Scale.** 1. *Description*. This scale consists of a series of groups of sentences which are to be punctuated. The groups are arranged in order of difficulty.

2. *Function*. This scale is designed to furnish a general measure of the pupil's ability to punctuate sentences.

3. *Time Required*. Accurate data are not available on this point. A class of children ought to complete the test in less than half an hour and the teacher should be able to score the papers with no more effort than is needed to mark the ordinary written language lesson of the same length.

4. The scale may be used in grades 5 to 8. It will also be useful in the high school.

5. One copy of the scale is needed for each pupil. There is only one form. Give the number of pupils to be tested.

6. *References*. Starch, D.: "The Measurement of Achievement in English Grammar," Journal of Educational Psychology, 6:615-626, December 1915.

7. *Price*: Including directions and score sheets, 70 cents per hundred. Postage extra.

**IV. Trabue Language Scales.** 1. *Description*. These scales are composed of completion sentences which are arranged in order of difficulty from the very simple to the very difficult. There are four scales for the elementary school, B, C, D, and E, and two scales for the high school, L and M.

2. *Function*. These tests aim to measure general language ability. These scales have often been used as intelligence tests. The scores of individual pupils on single scales are not highly reliable; hence several scales must be used in order to obtain a satisfactory measure of individuals.

3. *Time Required*. Each of the scales for the elementary grades requires seven minutes for its administration. Those for the high school take but five minutes each. The test papers may be scored at the rate of 50 an hour.

4. As has been implied above scales B, C, D, and E may be used in the elementary school and scales L and M in the high school.

5. The Bureau offers scales B, C, L, and M. One copy is required for each pupil. Give the number of elementary school pupils and the number of high school pupils to be tested. State which scales (B, C, L, or M) are desired.

6. *References*. Trabue, M. R.: "Completion-Test Language Scales," New York: Teachers College, Columbia University, 1916; Uhl, U. L.: "Mentality Tests for College Freshmen," Journal of Educational Psychology, 10:13-28, January, 1919.

7. *Price*: Including complete directions and class record sheets, 60 cents per hundred. Postage extra.

**V. Willing Scale for Measuring Written Composition.**

1. *Description*. This scale consists of eight compositions arranged in order of both "form value" and "story value." All of the compositions were written by school children under controlled conditions.

2. *Function*. The function of this scale differs from that of the Nassau County Scale in that it yields a measure of form (spelling, punctuation, and syntax) separate from the quality or "story value."

3. *Time Required*. Twenty-five minutes are required for writing the compositions. The rating of the compositions by means of the scale requires no more time than is usually required for "grading" them in the ordinary teaching routine. The length of time required can be reduced by practice. With added experience the work will be done more accurately.

4. This scale may be used in grades 4 to 12 inclusive.

5. Only one scale is needed for each teacher. One class record sheet is needed for each class. Give the number of scales and class record sheets desired.

6. *References*. Willing, M. H.: The Measurement of Written Composition in Grades 4 to 8," The English Journal, 7:193-252, March, 1918.

7. *Price*: Including complete directions and class score sheets, 5 cents each, extra class record sheets, one cent each. Postage extra.

**READING**

1. *Courtis Silent Reading Test No. 2*. 1. *Description*. This silent reading test consists of a simple and interesting connected story. The comprehension is measured by means of questions independently of the rate of reading.

2. *Function*. The function of this test is suggested by its description. It is to measure the rate and degree of comprehension resulting from the reading of a simple, interesting, connected story.

3. *Time Required*. Three minutes are allowed for the reading and five minutes for answering the questions. It is recommended by the author of the test that the scoring be done by the pupils, but it can be done by the teacher in two hours for a class of 25 pupils.

4. This test is to be used in grades 2 to 6 only.

5. There are three forms of the test. The Bureau carries Forms 1 and 3. In ordering specify which form is desired and give the number of pupils to be tested.

6. *References*. Forty-sixth Annual Report, Board of Education, Kansas City, Missouri, pp. 79-85, 1917.

7. *Price*: Including complete directions and class record sheets, \$2.00 per hundred. Postage extra.

II. *Gray Oral Reading Test*. 1. *Description*. This is the most widely used oral reading test. It consists of a series of standardized paragraphs arranged in order of increasing difficulty.

2. *Function*. This test is designed to yield a general measure of oral reading ability, including both the rate of reading and the quality. However, the data of the test may be so tabulated as to secure a diagnosis of oral reading ability.

3. *Time Required*. The pupils must be tested individually in a room apart from those who have not been tested. The time required for a pupil varies, but generally is about five minutes. The test is scored by the examiner as the pupil reads. The scores of a class of 25 pupils can be tabulated in less than an hour.

4. The test can be used in grades 2 to 8.

5. Only one form is available. One copy of the test is needed for each pupil.

6. *References*. Gray, W. S.: "Studies of Elementary School Reading through Standardized Tests," Supplementary Educational Monograph, Vol. I, No. 1, University of Chicago Press, 1917; Gray, W. S.: "Reading," Survey of the St. Louis Public Schools, St. Louis, Board of Education, 1917; Gray, W. S.: "The Use of Tests in Improving Instruction," Elementary School Journal, 19:121-143, October, 1918.

7. *Price*: Including complete directions and score sheet 70 cents per hundred. Postage extra.

III. *Gray Silent Reading Tests*. 1. *Description*. These tests consist of three selections, "Tiny Tad" for grades 2 and 3, "The Grasshoppers" for grades 4, 5, and 6, and "Ancient Ships" for grades 7 and 8. The comprehension is measured both by reproduction and by answering questions. The author states: "For the purpose of this thesis it was desirable to devise a test which would be as accurate as possible. Wherever questions arose, ease of giving the tests was usually sacrificed for increased accuracy in results."

2. *Function*. These tests were designed to yield a measure of the rate and comprehension of the silent reading of connected material. The rate is measured independently from the comprehension. These tests are recommended for measuring the silent reading ability of backward pupils and other cases requiring individual attention.

3. *Time Required*. It requires about five minutes to give the test to each pupil. Scoring the reproductions and answers requires additional time.

4. The tests can be used in grades specified in the first paragraph.

5. Since the same test is not used in all grades it is necessary to give the number of pupils to be tested in each grade. Only one form of the tests is available.

6. *References.* Gray, W. S.: "Studies of Elementary School Reading through Standardized Tests," Supplementary Educational Monographs, Vol. I, No. 1, University of Chicago Press, 1917; Gray, W. S.: "Reading," Survey of the St. Louis Public Schools, St. Louis, Board of Education, 1917. Annual Report of the Board of Education, East Side, Aurora, Illinois, pp. 66-68, 1916.

7. *Price:* Any one of the three selections, two cents each. A reasonable provision will be one copy of a selection for each ten pupils tested. Reproduction sheets, (one for each pupil), 55 cents per hundred. Postage extra.

**IV. Monroe Standardized Silent Reading Tests.** 1. *Description.* These tests consist of a number of exercises, each of which requires the pupil to read a paragraph and answer a simple question upon it. The paragraphs were taken from school readers and other books children read. These tests have been widely used.

2. *Function.* These tests yield measures of the rate of reading and the degree of comprehension. Since the rate and comprehension are measured concurrently, the rate score is the rate of reading plus answering the questions. The material read is not connected in thought from one paragraph to the next. Thus, the rate score has a different meaning than the rate score in the Courtis Silent Reading Test N. 2, and Gray Silent Reading Tests.

3. *Time Required.* The test requires five minutes to give. The test papers of a class of 25 pupils can be scored and the scores tabulated within one hour or less.

4. Test I is used in grades 3, 4, and 5, Test II in grades 6, 7, and 8, and Test III in grades 9, 10, 11, and 12.

5. Since different tests are used in different grades, it is necessary to specify for what grades the tests are desired. There are three forms of each test except Test III which can be had in only two forms. Give the number of pupils to be tested in each grade and the form desired.

6. *References.* Monroe, Walter S.: "Monroe's Standardized Silent Reading Tests," Journal of Educational Psychology, 9: 303-312, June, 1918.

7. *Price:* Including complete directions and class record sheets, 60 cents per hundred. Postage extra.

**V. Thorndike Scale Alpha 2 for Measuring the Understanding of Sentences.** 1. *Description.* This scale consists of a series of paragraphs and questions about the paragraphs arranged in order of difficulty of comprehension.

2. *Function.* This scale measures only the degree of comprehension and does this in terms of the difficulty of the exer-

cises which the pupil is able to do 80 per cent correctly. No measure of the rate of reading is secured.

3. *Time Required.* Twenty minutes are required to give the test. The scoring of the test papers and the tabulation of the scores are more difficult than for most tests but detailed directions and tables for facilitating this work are furnished with the test.

4. Part I is used in grades 3 to 5 and Part II in grades 6 to 12.

5. Since the same exercises are not used for all grades it is necessary to specify the grades in which it is to be used. Only one form is available. Give the number of pupils to be tested.

6. *References.* Thorndike, E. L.: "An Improved Scale for Measuring Ability in Reading," Teachers College Record, 16: 445-467, 17: 40-67, November 1915, January 1916; Thorndike, E. L.: "Reading as Reasoning: A Study in Mistakes in Paragraph Reading," Journal of Educational Psychology, 8:323-332, June 1917; The Madison Public Schools, Sixty-second Annual Report, 1916-17, Madison, Wisconsin, pp. 56-59; Seventh Report of the Board of Education, Louisville, Kentucky, pp. 36-39, 1917-1918.

7. *Price:* Including complete directions and class record sheets, \$1.00 per hundred for each part. Postage extra.

**VI. Thorndike Visual Vocabulary Scales.** 1. *Description.* Each of these scales consists of lists of words arranged in order of difficulty of meaning. The test requires the pupil to indicate the meaning of each word.

2. *Function.* These scales are designed to measure the pupil's knowledge of vocabulary which is an important factor in silent reading.

3. *Time Required.* It requires 20 minutes to give the test. The scoring requires about one hour for a class of ordinary size. The recording of the scores and calculation of the class score is facilitated by a record sheet and directions which are furnished with the test.

4. These scales may be used in grades 3 to 8.

5. There are four parallel forms, A2-x, A2-y, B-x, and B-y. In ordering state which form is desired. Give the number of pupils to be tested.

6. *References.* Thorndike, E. L.: "The Measurement of Achievement in Reading: Word Knowledge," Teachers College Record, 17:430-454, November 1916; "Report of a Survey of Public Education in Nassau County New York," University of the State of New York Bulletin, pp. 169-172, 1918.

7. *Price:* Including complete directions and class record sheets, 70 cents per hundred. Postage extra.

#### SPELLING

**I. Ayres Spelling Scale.** 1. *Description.* A thousand words constituting a fundamental English vocabulary have been

grouped in this scale according to their spelling difficulty, understanding that spelling difficulty is indicated by the per cent of correct spelling. The words were selected from four important reports on the frequency with which words are used in letters, newspaper articles, the English Bible, and various authors. They, therefore, constitute a fundamental vocabulary. The approximate per cent of correct spelling to be expected in each grade is shown for each word.

2. *Function.* This scale is not a test but merely a classified list of words from which selections may be made for a standardized test. Since these words are those most commonly used, a test chosen from the scale measures the ability of the pupils to spell words which they probable use in their written language.

3. *Time Required.* The time required will depend upon the number of words used.

4. This scale may be used in grades 2 to 8.

5. Only one scale is needed for each teacher. One class record sheet is needed for each grade. In ordering give the number of scales and class record sheets desired.

6. *References.* Ayres, L. P.: "A Measuring Scale for Ability in Spelling," New York, Russell Sage Foundation, "Spelling Test," Research and Measurement Bulletin No. 1, Pittsburgh, 1918; "The Results of a Spelling Test," Cleveland, Board of Education, Division of Reference and Research, Bulletin No. 2, 1918.

7. *Price:* Including complete directions and one class record sheet, 7 cents each, extra class record sheets, one cent each. Postage extra.

**II. Buckingham Extension of Ayres Spelling Scale.** 1. *Description.* This extension adds 509 words to the original Ayres Spelling Scale making a scale of 1509 words. The additions are mainly at the more difficult end of the scale and will thus add to its value especially for the grammar grades and the high school. The difficulty of each of the new words has been determined and approximates the values for the different grades printed above the column in which the word is placed.

2. *Function.* This scale provides a classified list of words from which a teacher may select a spelling test of known difficulty.

3. *Time Required.* The time required will depend upon the number of words used.

4. This scale is planned for use in grades 2 to 9. Indeed, the additional words make its use practicable throughout the high school.

5. Only one scale is needed for each teacher. One class record sheet is needed for each grade. In ordering give the number of scales and class record sheets desired.

6. *References.* None available.

7. *Price*: Including complete directions and one class record sheet, 8 cents; extra class record sheets one cent each. Postage extra.

**III. Monroe Timed Sentence Spelling Test.** 1. *Description*. Each of these tests consists of 50 words taken from suitable columns of the Ayres Spelling Scale and embodied in sentences. The sentences are then so arranged that they may be dictated at approximately the normal rate of writing in each of the grades.

2. *Function*. The function of a timed sentence spelling test is to secure a more valid measure of a pupil's real spelling ability than is secured by means of words dictated in lists. Pupils normally spelling words as they occur in sentences have their attention fixed more upon what they are writing than upon the spelling. This condition is approximated by a timed sentence spelling test.

3. *Time Required*. The time varies with the different grades and is only a little greater than would be used for a dictated list of 50 words.

4. Test I is used in grades 3 and 4, Test II in grades 5 and 6, and Test III in grades 7 and 8 and in the high school.

5. In ordering specify the grades in which the test is to be given unless the complete set is ordered. Only one copy is needed for each teacher. One class record sheet is needed for each grade. One form is now available. A second form will be devised when there is demand for it.

6. *References*. None available.

7. *Price*: Including three class record sheets, 8 cents per set, extra class record sheets one cent each. Postage extra.

## CHAPTER VII. STANDARIZED TESTS FOR HIGH SCHOOL SUBJECTS

Certain series of tests described for the elementary school have a test designed for the high school. See Monroe's Standardized Silent Reading Tests and Thorndike's Scale Alpha 2 for Measuring the Understanding of Sentences. Other tests described for the elementary school can be used with profit in the high school. This is particularly true for the tests in composition, language, and grammar.

### ALGEBRA

**I. Hotz First-Year Algebra Scales.** 1. *Description.* These scales consist of five lists of algebraic exercises: (1) addition and subtraction, (2) multiplication and division, (3) equation and formula, (4) problems, and (5) graphs. In each list the exercises are arranged in order of difficulty.

2. *Function.* These scales are designed to measure the ability of pupils in terms of the degree of difficulty of the exercises which just 50 per cent of the class are able to solve correctly. They are instruments for measuring the abilities of classes rather than of individual pupils. No measure of rate of work is secured.

3. *Time Required.* Pupils are allowed 110 minutes for the five tests of Series A and 200 minutes for Series B which is simply more elaborate than Series A. Additional time is required for scoring and tabulating.

4. These scales may be used as early as the end of the third month of the first year.

5. Only Series A is kept in stock by the Bureau of Educational Research. Series B can be obtained from the Bureau of Publications, Teachers College, New York City. In ordering give the number of pupils to be tested.

6. *References.* Hotz, H. G.: "First-Year Algebra Scales," New York, Teachers College, Columbia University, 1918.

7. *Price:* Including complete directions and class record sheets, Tests 1, 2, 3, and 4, 70 cents per hundred each test. Test 5, \$1.25 per hundred. Postage extra.

### GEOMETRY

**I. Minnick Geometry Tests.** 1. *Description.* There are five tests. Test A, drawing figures for propositions; Test B, stating what is given and what is to be proved in propositions; Test C, stating facts about figures given; Test D, organizing proof from given data.

2. *Function.* Tests A, B, C, and D are diagnostic.

3. *Time Required.* A maximum allowance of 30 minutes each is given to each test. The scoring requires about the same time as do ordinary geometry examination papers.

4. These tests may be used with all classes that have studied at least two books of plane geometry.

5. One copy of each test is required for each pupil. Only one form is offered.

6. *References.* Minnick, J. H.: "Minnick's Geometry Scale for Measuring Pupil's Ability to Demonstrate Geometrical Theorems," School Review 27:105-109, February 1919; Minnick, J. H.: "An Investigation of Certain Abilities Fundamental to the Study of Geometry," (A thesis) Philadelphia, University of Pennsylvania, 1918.

7. *Price:* Including complete directions and class record sheets, \$2.50 per hundred for each test. Postage extra.

#### HISTORY

**I. Sackett Scale in Ancient History.** 1. *Description.*

This scale is composed of six tests based on carefully selected information in ancient history.

2. *Function.* The scale aims to give a general measure of the pupil's grasp of the facts of ancient history.

3. *Time Required.* The pupils are given exactly 20 minutes to answer the questions in the six tests. The scoring takes about the time required to mark the papers in a history examination of six questions.

4. This test may be given to pupils who have completed the study of a year of ancient history.

5. One copy of the test is needed for each pupil in the class.

6. *References.* Sackett, L. W.: "A Scale in Ancient History," Journal of Educational Psychology, 8:285-293, May 1917.

7. *Price:* Including class record sheet, \$2.00 per hundred. Postage extra.

#### LATIN

**I. Henmon Latin Tests.** 1. *Description.* These tests are composed of two types of exercises which have been graded in order of difficulty. One set of exercises furnishes a measure of Latin vocabulary. The other set gives a measure of ability to translate Latin sentences. There are five vocabulary lists, A, B, C, D, and X and three sentence tests I, II, and III. Only tests D, X, II, and III are carried in stock.

2. *Function.* These tests are diagnostic in that they discriminate between a pupil's vocabulary and his ability to translate sentences. They are general in each of these fields.

3. *Time Required.* No data are available on this point.

4. The vocabulary test may be used with pupils who have had first-year Latin. Sentence Tests I and II may also be used with pupils who have had a single year's study of the language. Test III should not be given until Latin has been studied three or four years.

5. One copy of each test is needed for each pupil in the class. Indicate which tests are desired and give the number of pupils to be tested.

6. *References.* Henmon, V. A. C.: "The Measurement of Ability in Latin," *Journal of Educational Psychology*, 8:515-589, November and December, 1917.

7. *Price:* Including complete directions and score sheets, \$1.00 per hundred each test. Postage extra.

#### PHYSICS

**I. Starch Physics Test.** 1. *Description.* This test is composed of 75 sentences which are arranged in the form of completion tests. The degree to which the pupils have mastered the work in physics covered by these sentences is shown by their ability to fill in the missing words, phrases, and numbers. The test is broken up into topics and standard scores for each topic are printed on the test sheet. There are 28 sentences on mechanics, 8 on heat, 9 on sound, 9 on light, and 21 on magnetism and electricity.

2. *Function.* The test is designed to give a general measure of the pupil's mastery of the different topics in physics.

3. *Time Required.* The administration and the scoring of the test are comparatively simple. Neither requires as much time as would be given to the ordinary physics examination.

4. The test may be used with pupils who have completed the study of physics, or it may be given in parts as each topic is completed.

5. One test is required for each pupil. Only one form is available. Give the number of pupils to be tested.

6. *References.* None are available.

7. *Price:* Including complete directions and class record sheets, \$3.75 per hundred. Postage extra.

## CHAPTER VIII. MENTAL TESTS.

There are a number of group intelligence scales and tests on the market. None of them, however, is sufficiently reliable so that it can be used alone to secure accurate measures of the intelligence of individual children. To be safe, any person who administers group tests or scales should not be content with one measure, but should secure as many as his resources permit. In all probability the use of two or three of the better group intelligence tests will give a fairly reliable index of a child's intelligence, although the results of a single test might do him appreciable injustice.

The results of the use of these scales will assist in properly classifying children in the public schools. In this work several factors should be taken into consideration in addition to the crude scores. The mental test scores should be converted into mental ages and the mental ages should be considered in relation to the chronological ages. The simplest way to do this is to divide the mental age by the chronological age, thus securing a so-called intelligence quotient. If the children are more than 16 years of age (chronologically), 16 should be used as the divisor, since it has been assumed that mental maturity is reached at approximately the age of 16. The best use to make of these facts, then, is to prepare a table showing the relation between intelligence quotient and age for the grade. All children who are retarded—i. e., older chronologically than the normal age for the grade—should be canvassed to ascertain if they are qualified for extra promotions. If a child who shows an approximate normal intelligence quotient (1.00) is a year or two older than the average of his grade, and if he shows a reasonably satisfactory record in scholarship, he should be promoted to a higher grade and given such extra attention as is needed to bridge the gap caused by the extra promotion.

Mental tests may be used also to classify the children into homogeneous learning groups. The bright children and the dull children may each be put into sections where they will receive special treatment. The separation of the bright and the dull from the average has been found to facilitate the instruction of all three groups. The argument which school people sometimes advance, namely that the presences of bright pupils gives tone to a class, or in other words, that the average and the slow profit by the contact with better minds, is mainly an argument of conservatives opposed to innovation. The classification of children according to their mental ages is made possible by the tentative standards which are furnished with each of the tests and scales offered for sale by the Bureau.

Those who administer mental tests will frequently meet situations where the test that is being used with a group is too difficult for some of the children. These pupils who make zero

scores on some of the individual tests in the scales or will make zero scores on the entire scale. Wherever this happens the thing to do is to give the individual in question a chance to take a scale designed for more elementary mental types. There are, for example, children in the high school who are so mediocre in intelligence that their scores are much below the averages for children in the seventh and eighth grades. If high school pupils show up very poorly when tested with scales designed for the high school, they should be given scales designed for the seventh and eighth grades. Similarly, many children will be found in the fourth and fifth grades who can do nothing with the literary material prepared for use in these grades. Consequently, they should be tested with material designed for primary grades. Children whose mentality is too low to be measured by scales for the primary grades are probably so markedly inferior that they cannot profit by the ordinary work of the public schools. It is possible that they might do some of the kindergarten tasks, but they are hardly mature enough mentally to undertake the work of the primary grades.

### I. Holley Picture Completion Test for Primary Grades.

1. *Description.* This test is composed of pictures from which parts were omitted when they were drawn. The children are expected to complete the pictures by adding the missing parts. The pictures used in this scales have been evaluated. They are arranged approximately in order of difficulty from the simplest to the most difficult.

2. *Time Required.* The children are given five minutes in which to complete the pictures. Approximately ten minutes will be required by teachers in the second and third grades for the distribution of the papers, the filling in of the blanks, and the explanation of the directions which the children are given. The papers can be scored at the rate of 75 to 100 per hour.

3. Only one form of this test is available. It is suitable for use in the first three grades.

4. One copy of the test is needed for each pupil. In ordering give the number of pupils to be tested.

5. *References.* None available at this time.

6. *Price:* Including complete directions and score sheets, \$1.25 per hundred. Postage extra.

### II. Holley Sentence Vocabulary Scale.

1. *Description.* This test has been devised with the Terman Stanford-Binet Vocabulary as a basis. The words of this well-known vocabulary are put in sentences the last word of which is found among four words to the right. The children indicate the correct responses by underlining the word which completes the sentence. This scale has been found to be a fair measure of intelligence.

2. *Time Required.* These scales are given without time limits and the time required varies from about 35 minutes for the third grade to about 20 minutes for the twelfth grade. The

papers can be scored at the rate of approximately 35 an hour.

3. The vocabulary scale is prepared in two series: Series 3A for grades 3 to 8, and Series 3B for grades 7 to 12.

4. One copy of the test is needed for each pupil to be tested. In ordering give the series and the number of children to be tested.

5. *References.* None available.

6. *Price:* Including complete directions and score sheets, 75 cents per hundred. Postage extra.

**III. Pressey Primer Scale.** 1. *Description.* This scale is composed of four tests a dot pattern, a classification, a form-board, and an absurdities test.

2. *Time Required.* Approximately 25 minutes are required to administer it to a group of children and the papers can be scored at the rate of 35 per hour.

3. The scale is intended for use in the first three grades. Only one form is available at present.

4. One copy of the scale is needed for each pupil to be tested.

5. *References.* None available.

6. *Price:* Including complete directions and score sheets, \$1.00 per hundred.

#### MENTAL TESTS NOT SOLD BY THE BUREAU

**I. Otis Group Intelligence Scale.** 1. *Description.* The scale is composed of ten tests which measure various phases of mental ability.

2. *Time Required.* Approximately 70 minutes are required to administer it to a group of children. The papers can be scored at about the rate of 13 an hour.

3. Two forms of the scale are available. They may be used in grades 6 to 12. The author suggests their use in lower grades but only the brighter children can cope with them successfully below the sixth grade.

4. One copy of the scale is needed for each pupil to be tested. In ordering indicate the form desired and give the number of sets of 25 scales needed.

5. *References.* Otis, Arthur S.: "An Absolute Point Scale for the Group Measurement of Intelligence," *Journal of Educational Psychology*, pp. 239-261, 333-348, 1918.

6. *Publisher.* This scale is sold by the World Book Company, Yonkers-on-the-Hudson, N. Y.

**II. Virginia Delta 1.** 1. *Description.* This scale was devised by the Virginia Education Commission and was used in the mental survey of the schools in Virginia. It consists of six parts, composed of different types of materials.

2. *Time Required.* Approximately 30 minutes are required to administer this scale to a group of children. These tests can be scored at the rate of about 20 per hour.

3. Only one form of the scale is available at present.
4. One copy of the scale is required for each pupil taking the test. When ordering give the number of pupils to be tested.
5. *References.* None available.
6. *Publisher.* Published by the World Book Company, Yonkers-on-the-Hudson, N. Y.

**III. Virginia Delta 7.** 1. *Description.* This is another scale devised by the Virginia Education Commission. It was intended for use in the primary grades. It is composed of 12 tests. It is a new scale which promises to be of value for the primary grades.

2. *Publisher.* Published by the World Book Company, Yonkers-on-the-Hudson, N. Y.

**PRICE LISTS OF EDUCATIONAL TESTS, JANUARY, 1920**

The Bureau of Educational Research is prepared to furnish the test materials listed on the pages of this folder. The following statements should be read carefully before making an order.

**How to order standardized tests.** In ordering a standardized test of which one copy is needed for each pupil, give the number of pupils in each grade which are to be tested. This is important because in the case of certain tests, the exercises vary for different grades. Unless one is familiar with the details of the test or scale being ordered, it will be well to refer to the description of the test, particularly to item 5 in each description. Where more than one form is available, specify the form desired. One original and one duplicate record sheet will be furnished with every 25 test papers ordered. A limited number of additional copies will be supplied upon request. Class record sheets for one grade will be furnished with each scale. Where scales are to be used for more than one grade or by several teachers additional copies may be ordered. Price for additional copies will be furnished upon request. Cash should not accompany the order unless the total is for less than 25 cents. In this case remittance should be sent with the order and stamps will be received. A statement will be sent from the University Business Office for all amounts over 25 cents. Address all orders and correspondence, however, to the Bureau of Educational Research, University of Illinois, Urbana, Illinois.

**Prices.** All prices must be considered tentative. Industrial conditions are so unsettled that it is impossible to quote permanent prices at this time. Tests will be sold at cost and prices will be readjusted as conditions change. In many instances tests which originate outside of the Bureau are sold at a slight advance over the prices quoted by those who publish them. This advance has been made necessary because the Bureau has added accessory material to enable teachers and superintendents to give the tests intelligently. In no cases do the prices for tests in quantity include transportation charges.

All materials listed by the hundred will be charged for at the sample rate if less than 15 of each kind are ordered; but orders for different parts of the same test will be received as orders for only one kind. Thus, a person will receive quantity prices on less than 15 copies of Monroe's Standardized Silent Reading Test for grades 3 to 5, if at the same time he orders a sufficient number of copies for grades 6 to 8, or 9 to 12 or both to make a total of more than 15 copies.

**Accessory materials.** All accessory material will be supplied with every order unless the person ordering makes a specific statement that they are not wanted. Prices of tests without accessory material will be submitted upon request.

**Sample test materials.** The Bureau of Educational Research is not prepared to furnish free samples of tests listed in this folder. Sample copies of any of the tests including the accompanying accessories will be sent postpaid for the indicated price. Attention is called to the sample packages which have been assembled to meet the demands of superintendents and teachers.

For the convenience of persons unfamiliar with tests, the Bureau has assembled six sample packages which contain assortments of the tests so arranged as to meet different needs. Each test is accompanied by all existing accessory material.

**Sample Package A** contains one test for each of the subjects in the elementary school. The tests included are the ones believed to be best suited for teachers who are just beginning to make use of educational tests.

Courtis Standard Research Tests in Arithmetic, Series B  
 Monroe Standardized Reasoning Tests in Arithmetic  
 Ayres Handwriting Scale, "Gettysburg Edition"  
 Buckingham Extension of the Ayres Spelling Scale  
 Courtis Supervisory Test in Geography  
 Harlan Test of Information in American History  
 Charters Diagnostic Language and Grammar Test, Pronouns, Verbs

**A. Verbs B, and Miscellaneous**

Willing Scale for Measuring Written Composition  
 Gray Oral Reading Test  
 Monroe Standardized Silent Reading Tests I and II  
 Thorndike Visual Vocabulary Scale

Price: 60 cents postpaid

Sample Package B is no longer sold.

Sample Package C is composed of material for use in the high school. It consists of the following:

Hotz First-year Algebra Scale  
 Minnick Geometry Tests  
 Sackett Scale in United States History  
 Sackett Scale in Ancient History

Henmon Latin Tests:

- a) Vocabulary Test (D)
- b) Vocabulary Test (X)
- c) Sentence Test II
- d) Sentence Test III

Willing Scale for Measuring Written Composition

Nassau County Supplement to the Hillegas Scale

Thorndike Scale Alpha II for Measuring the Understanding of Sentences

Starch Physics Test  
 Monroe Silent Reading Test No. III  
 Jones Union Science Tests—Physics—(1 set)

Price: \$1.00 postpaid.

Sample Package D contains tests in arithmetic, reading, and spelling. It consists of the following:

## Arithmetic

Buckingham Scale for Problems in Arithmetic, Divisions 1, 2, and 3.  
 Cleveland Survey Arithmetic Tests

Courtis Standard Research Tests in Arithmetic, Series B

Courtis Supervisory Tests in Arithmetic, Tests A and B

Monroe Diagnostic Tests in Arithmetic, Parts 1, 2, 3, and 4

Monroe Standardized Reasoning Tests in Arithmetic, Tests I, II,

and III

Woody Arithmetic Scales, Series B, four tests

## Reading

Courtis Silent Reading Test, No. 2

Gray Oral Reading Test

Gray Silent Reading Tests

Monroe Standardized Silent Reading Tests I and II

Thorndike Scale Alpha II for Measuring the Understanding of Sentences, Parts 1 and 2

Thorndike Vocabulary Scales

## Spelling

Ayres Spelling Scale

Buckingham Extension of the Ayres Spelling Scale

Monroe Timed Sentence Spelling Tests

Price: \$1.20 postpaid

Sample Package E contains tests in geography, United States History, language, and grammar. It consists of the following:

## Geography

Courtis Supervisory Test in Geography

Hahn-Lackey Geography Scale

## History

Harlan Test of Information in American History

Sackett Scale in United States History

## Language and Grammar

Charters Diagnostic Language and Grammar Tests, Pronouns and Verbs A, Verbs B, and Miscellaneous.

Starch Punctuation Scale

Price: 65 cents postpaid

Sample Package F contains tests in handwriting and English composition. It consists of the following:

## English Composition

Nassau County Supplement to the Hillegas Scale

Willing Scale for Measuring Written Composition

## Handwriting

Ayres Handwriting Scale "Gettysburg Edition"

Freeman Chart for Diagnosing Faults in Handwriting

Gray Standard Score Card for Measuring Handwriting, Forms I, II, III, and IV

Thorndike Handwriting Scale

Price: 70 cents postpaid

Sample Package G is composed of intelligence tests. It consists of the following:

Holley Picture Completion Test for Primary Grades

Holley Sentence Vocabulary Scale

Pressey Primer Scale

Pressey Cross-Out Test

Whipple Group Test for Grammar Grades

Otis Group Intelligence Tests

Price: 70 cents postpaid

When they can be obtained there will be added to this package the Theisen-Flemming Classification Test and the Virginia Group Intelligence Scale, Delta 1. The price of the package will be increased to cover the expense of these additional tests.

## ORDER BLANK AND SUMMARY OF PRICES

The prices given below do not include transportation charges except in the case of sample copies and sample packages. A sample set of any test includes one copy of each test or division of the series, together with one copy of each of the accessories. In case there is more than one form of the test, only one form is included in the sample test.

## ELEMENTARY SCHOOL TESTS

**Arithmetic**

No. Copies

## 1. Buckingham Scale for Problems in Arithmetic

Sample Set, 7 cents -----  
 Division I, for grades 3 and 4, 70 cents per 100 -----  
 Division II, for grades 5 and 6, 70 cents per 100 -----  
 Division III, for grades 7 and 8, 70 cents per 100 -----  
 2. Cleveland Survey Arithmetic Tests, for grades 3 to 8,  
 \$1.90 per 100 -----  
 Sample Set, 9 cents -----

## 3. Courtis Standard Research Tests in Arithmetic, Series B

Sample Set, 22 cents -----  
 Form 1 for grades 4 to 8, \$1.00 per 100 -----  
 Form 3 for grades 4 to 8, \$1.00 per 100 -----

## 4. Monroe Diagnostic Tests in Arithmetic

Sample Set, 10 cents -----  
 Part I, Integers, for grades 4 to 8, 70 cents per 100 -----  
 Part II, Integers, for grades 5 to 8, 70 cents per 100 -----  
 Part III, Common Fractions, for grades 6 to 8, 70 cents per 100 -----  
 Part IV, Decimal Fractions, for grades 6 to 8, 70 cents per 100 -----

## 5. Monroe Standardized Reasoning Tests in Arithmetic

Form 1  
 Sample Set, 7 cents -----  
 Test I, for grades 4 and 5, 65 cents per 100 -----  
 Test II, for grades 6 and 7, 65 cents per 100 -----  
 Test III, for grade 8, 65 cents per 100 -----

Form 2  
 Sample Set, 7 cents -----  
 Test I, for grades 4 and 5, 65 cents per 100 -----  
 Test II, for grades 6 and 7, 65 cents per 100 -----  
 Test III, for grade 8, 65 cents per 100 -----

## 6. Woody Arithmetic Scales, Series B,

Sample Set, 6 cents -----  
 Four tests, 50 cents per 100 each test -----

**Geography**

## 1. Courtis Standard Supervisory Test in Geography,

\$1.00 per 100 -----  
 Sample Set, 25 cents -----

	No. Copies
2. Hahn-Lackey Geography Scale, 10 cents each	-----
Extra record sheets, 1 cent each	-----
<b>Handwriting</b>	
1. Ayres Handwriting Scale "Gettysburg Edition,"	
7 cents each	-----
Extra Record sheets, 1 cent each	-----
2. Freeman Chart for Diagnosing Faults in Handwriting,	
30 cents each	-----
3. Gray Standard Score Card for Measuring Handwriting	
Sample Set, 15 cents	-----
Form I, 50 cents per 100	-----
Form II, 50 cents per 100	-----
Form III, 10 cents each	-----
Form IV, 30 cents per 100	-----
4. Thorndike Handwriting Scale, 10 cents each	
Extra record sheets, 1 cent each	-----
<b>History</b>	
1. Harlan Test for Information in American History,	
75 cents per 100	-----
Sample Set, 4 cents	-----
2. Sackett Scale in United States History, \$2.00 per 100	
Sample Set, 6 cents	-----
<b>Language, Grammar, and Composition.</b>	
1. Charters Diagnostic Language Tests for grades 3 to	
8, Form 1	
Sample Set, 8 cents	-----
Pronouns, 55 cents per 100	-----
Verbs A, 55 cents per 100	-----
Verbs B, 55 cents per 100	-----
Miscellaneous, 55 cents per 100	-----
2. Charters Diagnostic Language and Grammar Tests	
for grades 7 and 8, Form 1	
Sample Set, 10 cents	-----
Pronouns, \$1.15 per 100	-----
Verbs A, \$1.15 per 100	-----
Miscellaneous, \$1.15 per 100	-----
3. Nassau County Supplement to the Hillegas Scale,	
10 cents each	-----
Extra class record sheets, 1 cent each	-----
4. Starch Punctuation Scale, 70 cents per 100	
Sample Set, 4 cents	-----
5. Trabue Language Scales	
Sample Set, 8 cents	-----
Scale B, 60 cents per 100	-----
Scale C, 60 cents per 100	-----
Scale L, 60 cents per 100	-----
Scale M, 60 cents per 100	-----

	No. Copies
6. Willing Scale for Measuring Written Composition, 5 cents each	
Extra record sheets, 1 cent each	
<b>Reading</b>	
1. Courtis Silent Reading Test No. 2	
Sample Set, 17 cents	
Form 1, for grades 2 to 6, \$2.00 per 100	
Form 3, for grades 2 to 6, \$2.00 per 100	
2. Gray Oral Reading, 70 cents per 100	
Sample Set, 4 cents	
3. Gray Silent Reading Tests	
Sample Set, 10 cents	
Selections	
"Tiny Tad" for grades 2 and 3, 2 cents each	
"Grasshoppers" for grades 4, 5, and 6, 2 cents each	
"Ancient Ships" for grades 7 and 8, 2 cents each	
Reproduction sheets	
"Tiny Tad" for grades 2 and 3, 55 cents per 100	
"Grasshoppers" for grades 4, 5, and 6, 55 cents per 100	
"Ancient Ships" for grades 7 and 8, 55 cents per 100	
4. Monroe Standardized Silent Reading Tests	
Sample Set, 6 cents	
Form 1	
Test I, for grades 3, 4, and 5, 60 cents per 100	
Test II, for grades 6, 7, and 8, 60 cents per 100	
Form 2	
Test I, for grades 3, 4, and 5, 60 cents per 100	
Test II, for grades 6, 7, and 8, 60 cents per 100	
Form 3	
Test I, for grades 3, 4, and 5, 60 cents per 100	
Test II, for grades 6, 7, and 8, 60 cents per 100	
5. Thorndike Scale Alpha 2 for Measuring the Understanding of Sentences	
Sample Set, 6 cents	
Part I, for grades 3 to 5, \$1.00 per 100	
Part II, for grades 6 to 12, \$1.00 per 100	
6. Thorndike Visual Vocabulary Scales	
Sample Set, 6 cents	
Form A2-x, 70 cents per 100	
Form A2-y, 70 cents per 100	
Form B-x, 70 cents per 100	
Form B-y, 70 cents per 100	
<b>Spelling</b>	
1. Ayres Spelling Scale, 7 cents each	
Extra record sheets, 1 cent each	
2. Buckingham Extension of the Ayres Spelling Scale, 8 cents each	
Extra record sheets, 1 cent each	
3. Monroe Timed Sentence Spelling Test	
Sample Set, 12 cents	
Five or more sets, 8 cents per set	
Extra record sheets, 1 cent each	

## HIGH SCHOOL TESTS

In addition to tests specifically designed for use in the high school, a few tests for elementary school use are listed because it is believed they may be used profitably.

	No. Copies
<b>Henmon Latin Tests</b>	
Sample Set, 10 cents	
Vocabulary D, \$1.00 per 100	
Vocabulary X, \$1.00 per 100	
Sentence II, \$1.00 per 100	
Sentence III, \$1.00 per 100	
<b>Hotz First-Year Algebra Scale</b>	
Sample Set, 15 cents	
Test 1, 70 cents per 100	
Test 2, 70 cents per 100	
Test 3, 70 cents per 100	
Test 4, 70 cents per 100	
Test 5, 90 cents per 100	
<b>Minnick Geometry Tests</b>	
Sample Set, 15 cents	
Test A, \$2.50 per 100	
Test B, \$2.50 per 100	
Test C, \$2.50 per 100	
Test D, \$2.50 per 100	
<b>Monroe Standardized Silent Reading</b>	
Sample Set, 5 cents	
Form 1, Test III, 60 cents per 100	
Form 2, Test III, 60 cents per 100	
<b>Nassau County Supplement to the Hillegas Scale,</b>	
10 cents each	
Extra record sheets, 1 cent each	
<b>Sackett Scale in Ancient History, \$2.00 per 100</b>	
Sample Set, 6 cents	
<b>Sackett Scale in United States History, \$2.00 per 100</b>	
Sample Set, 6 cents	
<b>Starch Physics Test, \$3.75 per 100</b>	
Sample Set, 5 cents	
<b>Thorndike Scale Alpha 2 for Measuring the Understanding of Sentences</b>	
Sample Set, 5 cents	
Part II, \$1.00 per 100	
<b>Willing Scale for Measuring Written Composition, 5 cents each</b>	
Extra record sheets, 1 cent each	
<b>MENTAL TESTS</b>	
<b>Holley Picture Completion Test for Primary Grades,</b>	
\$1.25 per 100	
Sample Set, 5 cents	
<b>Holley Sentence Vocabulary Scale</b>	
Series 3A for grades 3 to 8, 75 cents per 100	
Series 3B for grades 7 to 12, 75 cents per 100	
<b>Pressey Primer Scale for grades 1 to 3, \$1.00 per 100</b>	
<b>Theisen-Flemming Classification Test, price to be announced</b>	
Sample Set, price to be announced	
<b>SAMPLE PACKAGES</b>	
Sample Package A, 60 cents	
Sample Package C, \$1.00	
Sample Package D, \$1.20	
Sample Package E, 65 cents	
Sample Package F, 70 cents	
Sample Package G, 70 cents	
Address all orders and correspondence to the Bureau of Educational Research, University of Illinois, Urbana, Illinois.	



